

THE IRON AGE

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Material Cost Accounting in a Foundry

Outline of Procedure and Some of the Blank
Forms Suitable for the Small as Well
as Large Foundry

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IF costs are to be accurate, a careful records of orders, prices, receipts and usage must be kept of all materials. It is not necessary to describe the purchase order and material receipt forms, for these are in common use.

The amount of materials on hand are recorded on form 12. This form gives a perpetual inventory. If the quantities shown are checked at intervals, when the items fall to the minimum, accuracy will be maintained.

Some of the materials are issued from stock upon a requisition issued by someone in authority. Two similar forms are used, marked in some way to differentiate between productive and non-productive materials, in order to facilitate recording by the cost clerk. The requisitions for each kind of material are summarized separately, so that they may be charged and debited to the correct accounts.

It is not necessary to use requisitions for flour, core oil, and compounds. These items can be charged to the expense department when they are purchased, and spread to the product with the other overhead.

Pig iron, scrap, fuel and flux are reported, not on requisitions, but on form 18—a form essential to any well-managed foundry. The accounting for these items will be described further on in this article, when we discuss the melting and metal cost. Let us see now how the various kinds of material are priced into the product.

If the market price of materials remained constant, there would be no difficulty in correctly pricing the materials used, but since a foundry nearly always has on hand several lots of the same material, bought at different prices, incorrect choice of the price to use causes serious inaccuracies in costing.

When the materials are purchased, the amounts are charged to the inventory account in the general ledger, and when they are withdrawn from stock the value of the withdrawals is credited to the accounts. Obviously it is necessary to price the materials and

supplies correctly, if the proper balance is to be kept in the value of the running inventory.

Before describing the correct way of pricing materials, let us see why that most commonly used method, the average price, is wrong. A simple calculation, based on assumed figures, will prove the point.

Suppose there have been purchased 1000 units of material at \$.50, amounting to \$500 and that 500 units have been issued at this price, leaving a balance of 500 amounting to \$250. Then there were received 1000 more units, at \$.40, amounting to \$400. This gives a balance on hand of 1500 units, valued at \$650. Dividing this value by the total units in stock, gives an average price per unit of \$.433.

Two lots of these units are then issued, before another purchase is made, thus leaving a balance of three hundred units valued at \$129.90. A third purchase of 1000 units is then recorded, this time at \$.30 per unit, making the amount \$300, which when carried to the balance columns gives a total stock of 1300 units valued at \$429.90. This gives a new average price of \$.3307. Two lots are then issued and the stock exhausted.

The total purchases of \$1,200 have been debited to the inventory account. The total issued credited to the inventory account is only \$1199.51. This

gives a shortage of \$.49. While this is a small amount, it exists on only one item. Similar discrepancies on all of the items of materials and supplies purchased by a foundry would amount to a good big sum.

The difference of \$.49 is due to the fractional average prices. Had the decimals been carried out to several additional places, theoretically the \$1199.51 would have amounted to \$1,200, and the accounting would be correct on an average price basis. The fact is, however, that most clerks cut the average price short in the number of decimals to save figuring, and the inaccuracies are multiplied; consequently this method cannot be approved.

There is but one correct method, which is to cost out the materials and supplies at the price purchased,

THE methods outlined in this article are adaptable to any foundry, small or large. They are, with the changes which will be obvious to any reader, now in use in foundries making gray iron, malleable, steel, or non-ferrous castings.

In devising the methods practical accuracy has been the chief consideration, for if cost figures are not accurate, they are worse than useless. They are as simple as can be, accuracy considered. The system may seem somewhat complicated; actually, it is so simple to operate that in a small foundry the records can be maintained on part of the time of a single bookkeeper.

*Of Miller, Franklin, Basset & Co., Inc.

plus any freight and carrying charges, the sum of which has constituted the total debit to the general ledger account for that purpose.

The stores inventory record, Form 12, makes this possible. The first lot is 1000 units at \$.50, which was entirely exhausted before the new lot was drawn upon, although the new lot was received March 1, and material was being issued from the first lot up to and including March 6. On March 6 100 units were requisitioned, but there were only 50 left in the first lot; consequently the requisitions were priced 50 at \$.50 each to close out the first lot, and 50 at \$.55 each to begin withdrawals from the second lot. It will be clear that in practice it is not necessary actually to use first that lot which was first received, but in pricing the issued material and supplies, the price of the first lot received should be used until the equivalent in quantity of that lot has been used. The physical inventory must be priced in the same way.

Whether the material be bolts, pig iron, sand, coke or miscellaneous supplies, the same method must be used in order to keep the book inventory in the general ledger in agreement with the physical inventory. Persistent checking of the physical inventory will keep the inaccuracies due to shrinkage and error of count to a minimum and avoid any marked discrepancies which would otherwise develop.

There is a necessary exception in the general method of accounting for materials, to be noted in the case of pig and scrap iron. The daily foundry report, form 19, shows the amount of material used and the foundry production as a whole. The actual consumption of pig and scrap iron, however, is not the weight drawn from the physical stock, as recorded on the stores inventory record, but is the total weight found in the good castings produced, plus the loss in melting. The balance, including defective castings, gates, sprues, and over-iron, is remelted and moved in a circle, so to speak.

In detail, here is how the metal cost is determined.

As we shall see in another article on overhead expense, the overhead of each department is gathered on an analysis form for that department. Form 37-8 is the analysis for the melting department.

It is advisable to divide the melting cost into two parts: therefor we develop on form 37-8a, not here shown, the metal cost. The total expense of the melting is found to be \$935.51, to which is added the direct melting labor. This gives a total of \$1285.51 for melting labor and expense. "Pounds of metal melted" and "Cost per pound to melt" are not used as cost figures, but are a guide to the efficiency of the operations.

"Total pounds of all castings produced" includes all castings, good and bad. This item in connection with the labor and expense gives a base cost per pound of \$.00415.

Let us see why this "base" cost is used. Of the total metal charged into the cupola, only part of it is found in the castings, consequently in order to arrive at the melting cost of good castings, there must be deducted the scrap returned to the cupola, consisting of scrapped castings, sprues, gates and over-iron; but not the scrapped castings returned from the other departments, such as the machine shop, mounting shop, etc. The net weight of these good castings, 280,000 lb., is obtained from the foundry report summary, form 20.

If this weight were used to determine the melting cost, the cost per pound to melt would be

$$\frac{1,285.51}{280,000} = \$0.00459$$

In foundries whose product is uniform and whose percentage of loss is fairly constant, this method will give satisfactory results; but in foundries with a variety of work and correspondingly varying percentages of loss, it will not give correct costs.

Using the base cost per pound, a type of casting with 5 per cent loss would carry a melting cost of \$.0043575 per pound for good castings, while a 15 per cent loss on another class of casting would result in a melting cost per pound of good castings of \$.0047725.

The 15 per cent class thus shows a melting cost per pound for good castings which is \$.000415 higher than

the 5 per cent class. The difference may seem insignificant, but for a large production the error would quickly amount to thousands of dollars.

Note that the percentage of loss is taken as the ratio of bad castings to good castings, not the ratio of bad to total. The unit cost is determined on the basis only of good and bad castings produced. The reason for using this basis to determine the unit cost of melting will be obvious with the following illustrations.

The analysis figures are used to illustrate the point.

	Pounds	Cost
Melting cost	400,000	\$1,285.51
Melting loss	20,000	
Metal accounted for.....	380,000	
Gates, sprues, etc.....	70,000	
Net good and bad castings	310,000	
Melting cost		\$1,285.51
Cost per lb. to melt.....		.00415

The return of the 70,000 lbs. of gates, sprues, etc., for remelting does not change the cost to melt 400,000 lbs. It has cost this amount of money, in labor and expense, to produce the 310,000 lbs. of castings.

In foundries making both large and small castings, the ratio of gates, sprues, etc., and melting loss may have marked effect upon the accuracy of the unit cost.

Only part of the metal melted is to be found in the castings. The balance—bad castings, gates, sprues, and over iron, must be returned to the pig and scrap account. These items are taken from form 20, and are as follows:

Bad or defective castings.....	30,000 lb.
Gates, sprues, etc.....	40,000 lb.
Return scrap	10,000 lb.
Total scrap	100,000 lb.

Which at the scrap value of \$18 per net ton, amounts to \$900. Deducting this from \$6,000, the total cost of the metal charged, leaves a net cost of metal in good castings of \$5,100.

The original value of the metal charged is found on the foundry report summary, form 20.

Pig iron	150 tons @ \$34	\$5,100	
Scrap	50 tons @ 18	900	
Total	200	\$6,000	\$6,000
Cost per ton of mix.....		\$30	
Scrap Returned—			
Original value, 50 tons at mix			
price	\$30	\$1,500	
Scrap value, 50 tons at.....	18	900	900
Loss by difference in value		\$600	
Net cost of metal in good			\$5,100
castings			

Thus the \$600 loss, by difference in value, remains in the net cost of metal, which is \$5,100.

There is still a further loss, through melting, of 5 per cent, amounting to 20,000 lbs, which has not been considered in the total scrap returned, but the value of which remains in the \$5,100 net cost of metal. This melting loss, when added to the accounted-for scrap, makes a total of 120,000 lbs., thus leaving 280,000 lbs. of good castings as shown on form 20, and on the melting sheet in the analysis.

The cost of metal, at this point, for the 140 tons of good castings amounts to \$5,100. The original value of the 140 tons at the mix cost of \$30, amounts to \$4,200, leaving a loss to be absorbed in the final pound cost of \$900.

If the 140 tons of metal in the good castings were taken at the mix value of \$30, amounting to \$4200, there would be an unaccounted for loss of \$900, and the cost would be too low, unless additional percentages be considered to account for such losses.

If the 140 tons are figured at the net value of metal, \$5,100, this \$900 loss will be absorbed into the final cost per pound of good castings. The cost per ton will then be \$36.4286, instead of \$30.

It is, however, better to take scrap at scrap value, because if, as sometimes happens, it is sold, it will bring only the market price, and the difference would show a loss in the inventory.

While this accounting for metal takes care of the totals in the general ledger, the net cost of metal,

MIN.		AMT TO ORDER		DATE CHECKED	BY	USED PREVIOUS PERIODS		STORES INVENTORY RECORD.	DESCRIPTION OF STOCK.		INDEX		
300	1000	2-24	J.C.			1218 1720	1315 25300		1320 20000				
									UNIT <u>Pieces</u>		LOCATION		
									QUANTITIES USED & BALANCE				
ORDERED			DATE		RECEIVED			TOTAL		QUANTITIES USED & BALANCE			
DATE	ORDER NO.	QUAN.	BILLED	DATE	ORDER NO.	QUAN.	AMOUNT INVOICE	RECEIVED	UNIT PRICE	DATE	QUAN ISSUED	BALANCE	
1/21													
2-10	2567	1000	2-11	2-15	2567	1000	45000	5300	50	2/15	-	1000	275
										2/17	150	250	125
										2/20	200	650	50
										2/22	75	375	50
										2/24	200	375	0
2-25	3751	1000	2-27	3-1	3751	1000	43500	5500	55	3/1		1000	
										3/6	50	950	

The Amount of Materials on Hand is Recorded on Form 12, Which Gives a Perpetual Inventory

At the Right is Shown Form 18, an Essential for Any Foundry, for Reporting Pig Iron, Scrap, Fuel and Flux, Without Use of Requisitions for the Purpose. Accounting for the items is described in the article

DAILY CHARGE SHEET											
DATE		FUEL		PIG IRON				SCRAP		TOTAL WEIGHT POUNDS	REMARKS
CUPOLA NO.		COKE LBS	NO 1X	NO 2X	etc.	FLUX					
<u>DED CHARGE</u>											
CHARGE NO.											
1	2										
10	11										
11	12										
12	13										
13	14										
14	15										
15	16										
16	17										
17	18										
18	19										
19	20										
20	21										
21	22										
22	23										
23	24										
TOTAL											
BLAST ON FIRST IRON		TIME	BLAST PRESSURE OZ'S				RETURNS LBS		RECORDED BY.		
		TIME									
		OZ									
BOTTOM DROP		TIME					OVER IRON RUN				
BLAST TO DROP		MIN:SS					DROP IRON				
							TOTAL				

IRON FOUNDRY REPORT					DATE _____					
METAL CHARGED					TOTAL PRODUCTION					
KIND	%	LBS.	PRICE	AMOUNT	METAL AND CASTINGS	WEIGHTS				
Pig					Metal Charged	A	420000			
"					Metal Poured	B	270000	270000		B-TAN
"					Gross Melting Loss	C	80000		30000	C-B-B
"					% " " "	D	7 1/2 %			D-S
TOTAL PIG		500000	34. T	5700 00	Productive Castings	E	270000			
Gate Scrap					Shop "	F				
Mold "					Spilled "	G				
Steel "					Defective "	H	30000			
Shop "					TOTAL CASTINGS	T	210000	310000		
Return "					Moulding and Paving Loss	I		60000	60000	I-B-T
					% " " " "	J			15 %	J-K
					Gross Production Loss	K			90000	K-C+I
TIME TO POUR		100000	18. T	900 00	% Gross Production Loss	L			33 1/2 %	L-K
TOTAL IRON		400000		6000 00	Less Gates and Sprues	M	60000			
Gate					" Return Scrap	N	10000		70000	
Shop										
					Net Loss	O			20000	O-K-(MIN)
TOTAL FUEL		80000	7.50	300 00	% Net Loss to Net	P			5 %	P-O
Flux Used										
Iron Melts Per Lb. of Fuel				5 LB.	Remarks					
MELTING TIME					DAILY REPORT					
Start Put on				P.M.						
Bottom Dropped				P.M.						
Time of Heat				HRS.						
Iron Melts in Tons Per Hour										
Blow Pressure				PSI						

At the Left is the Daily Foundry Report, Form 19, Showing Amount of Material Used and the Foundry Production as a Whole. The actual consumption is not the weight drawn from physical stock, as recorded in the stores inventory record, but the total weight found in good castings produced plus the loss in melting.

\$5,100, is not used for cost purposes. The application of metal costs differs, since the unit cost is based on the total castings produced.

The cost of the total metal melted is \$6000. The amount of melting loss, 20,000 lb., deducted from the weight melted, 400,000 lb., leaves 380,000 lb. which is the total metal accounted for. But this deduction does not change the original cost of \$6000.

Since the unit cost is based on the total of good and bad castings produced, the bad castings must not be deducted until the cost by classification or order is determined. Therefore the next step is to deduct the weight of gates, sprues and over-iron, 70,000 lb. at the scrap value of \$630, which gives the weight of the good and bad castings as 310,000 lb., and the net cost of metal in all castings as \$5370. The cost of metal per pound for all castings then becomes \$.01732, which is the base cost with 100 per cent good castings.

Some foundries figure the cost on the pounds melted with a percentage added to account for the intermediate losses. This method gives the same result, but is more complicated, and increases the possibility of errors.

The melting loss in the cupola is the same for all metal. We have assumed, for the sake of simplicity, that the gates, sprues and over-iron bear a constant ratio to the weight of castings produced. This, however, is not always true; but it would not be practicable in many foundries to determine the actual weight of gates, sprues and runners for each classification of castings, or for each order.

In a foundry, however, whose castings are all small, particularly gated work, the gates and sprues may weigh half as much as the castings or even exceed the weight of the castings. This is frequently true in malleable and brass foundries.

The calculation of metal on a specific order will be as follows:

Total castings	310,000 @	\$.01732	\$5,370
Bad castings (scrap credit)	30,000 @	0.009	270
Good castings	280,000		\$5,100
Cost per lb. of good castings.....			.01821

When these conditions exist the cost per pound can not be determined on the basis of good and bad

EXPENSE ANALYSIS

8	MELTING	FOR MONTH OF JANUARY			FOR MONTH OF FEBRUARY		
		NORMAL	ACTUAL	PERIOD TO DATE	NORMAL	ACTUAL	PERIOD TO DATE
	MISCEL. LABOR		80.00		FROM	PAYROLL	
	COKE		300.00		"	FOUNDRY REPAIR	
	FLUX				"	"	
	SMALL TOOLS		10.00		"	E. REQUISITIONS	
	OILS, GREASE, WASTE		6.00		"	E	
	RELINING MATERIALS		20.00		"	E	
	MISCEL. SUPPLIES		12.00		"	E	
	MAINTENANCE MATERIALS		14.00		"	E	
	TOTAL DIRECT EXPENSE		442.00				
1	SHARE STEAM				"	DEPT. NO. 1	
2	" POWER & LIGHT		50.35		"	" NO. 2	
3A	" T.E.M. LAB. & EXP.		65.61		"	" NO. 3	
"	FIXED CHARGES		10.30				
	TOTAL		568.26				
6	SHARE GENERAL FACTORY		191.07		"	DEPT. NO. 6	
7	" " FOUNDRY		176.18		"	" NO. 7	
	TOTAL MELTING EXPENSE	1023.00	935.51				
	DIRECT MELTING LABOR	400.00	350.00		"	PAYROLL	
	TOTAL LABOR & EXPENSE	1423.00	1285.51				
	POUNDS OF METAL MELTED		4000.00				
	COST PER POUND TO MELT		.00331				
	TOTAL LBS. ALL CASTINGS PRODUCED		3100.00				
	BASE COST PER POUND -						
	LABOR	.0013	.0013				
	EXPENSE	.0033	.00302				
	TOTAL	.0046	.00415				
	ABNORMAL LAB. & EXPENSE						
	LABOR LOSS						
	GAIN	53.00					
	EXPENSE LOSS						
	GAIN	87.49					
	NET LOSS						
	GAIN	140.49					

Form 37-8, Analysis for the Melting Department

castings alone, but must be determined on the basis of the weight of all castings including the gates and sprues. The gangway iron, over-iron, etc., would have to be considered as a whole, as it would be quite impracticable to determine this by classification or order of castings.

These points are of vital importance in the determination of correct costs, and cannot be overlooked.

So far, the iron cost has been kept separate from the cost of melting. When estimating it may be necessary to use new market prices for the metal so that instead of \$30 per ton of mix, we may need to use \$35 per ton of mix. This would require an adjustment

YEAR _____		SUMMARY IRON FOUNDRY REPORT																MONTH - <u>January</u>										
DATE	METAL						FUEL		PRODUCTION						GROSS LOSS		RETURNS		NET LOSS		TOTAL SCRAP		DATE					
	PIG IRON		SCRAP IRON		TOTAL		WT. TO	WT. VALUE	METAL CHRGD	METAL POURD	BE MELTS		CASTINGS		WASTE POUR	PRODUCT N	GATES	FROM	TOTAL	WT. TO	WT. VALUE							
	WT	VALUE	WT	VALUE	WT	VALUE					WT	%	PROD	SHOP								DEFECT		TOTAL	WT	%	WT	%	SCRAP	LOCATION
1																							1					
2																							2					
3																							3					
4																							4					
5																							5					
6																							6					
7																							7					
26																							26					
27																							27					
28																							28					
29																							29					
30																							30					
31																							31					
TOTAL	300000	310000	100000	50000	600000	600000	5	80000	300000	600000	570000	50000	7.5	280000	30000	310000	60000	1.5	30000	22.5	60000	100.00	70000	20000	5	100000	300000	TOTAL
<div>JOURNAL ENTRIES</div> <div><div>A</div><div>B</div><div>C</div><div>D</div><div>E</div><div>F</div><div>G</div><div>H</div><div>I</div><div>J</div><div>K</div><div>L</div><div>M</div><div>N</div><div>O</div><div>P</div><div>Q</div><div>R</div><div>S</div><div>T</div><div>U</div><div>V</div><div>W</div><div>X</div><div>Y</div><div>Z</div></div> <div>MANUFACTURING EXPENSE</div> <div>FUEL ACCT</div> <div>GOODS IN PROCESS</div> <div>PIG & SCRAP ACCT</div> <div>DR</div> <div>CR</div> <div>PIG & SCRAP</div> <div>GOODS IN PROCESS</div> <div>DR</div> <div>CR</div>																												

The Foundry Report Summary, Form 20, Gives the Net Weight of the Good Castings

in the metal cost to meet the market price of pig and scrap.

The calculation will then be as follows:

Original cost per ton of mix.....	\$30.00
New cost per ton of mix.....	35.00
Increase in cost per ton of mix.....	\$5.00
Per cent increase.....	16.7
Original metal cost per pound.....	.01732
16.7 per cent adjustment.....	.00289
New pound cost for estimate.....	.02021

The calculation on the metal sheet of the expense analysis would be as follows:

200 tons of mix @ \$35.....	\$7,000
Scrap credit (gates, sprues, etc.).....	735
Cost of metal, all castings.....	\$6,265
Weight castings produced, lb.....	310,000
Cost per pound all castings.....	\$0.02021

The correctness of the percentage application method is proved by the fact that the cost per pound checks in these two calculations.

Using the above method of accounting for the market fluctuations in the price of metal will be found particularly valuable when costs are collected on standard lines of production, like ranges, stoves, heaters, etc. The standard cost may remain constant when provision is made for adjusting the metal cost, providing that the costs in the other departments remain constant.

Electric Steel Castings Problems Discussed

The Electric Steel Founders' Research Group held a convention at East Aurora, N. Y., on April 13 and 14. Representatives and executives, a total of 26, from the five electric steel casting plants forming the group, joined in a discussion of steel foundry problems. W. H. Worrielow, president Lebanon Steel Foundry, Lebanon, Pa., presided.

The first day's program included the reading and discussion of a paper on "Electric Steel Castings for Specialties" by W. J. Nugent, vice-president Electric Steel Co., Chicago; and also a paper on "Properties of Electric Steel Castings and Where They Should be Used" by T. S. Quinn, treasurer Lebanon Steel Foundry. The second day's program was featured by a paper on "Cost Accounting" by L. S. Perego, secretary Sivyer Steel Casting Co., Milwaukee, and a paper on "Salesmanship" by J. C. Redmond, Michigan Steel Casting Co., Detroit.

Among the representatives who made addresses was C. R. Messinger, vice-president Sivyer Steel Casting Co., who called attention to the significance and benefits obtained from cooperative efforts in conducting electric steel foundry research work. H. J. Koch, secretary Fort Pitt Steel Casting Co., McKeesport, Pa., gave some interesting points on systematic production planning and analysis of customers' requirements. R. A. Bull, research director of the group, spoke on the various phases of research work being undertaken by the five group foundries to maintain and improve the quality of their steel castings and decrease costs of production. W. J. Corbett, industrial engineer of the group, spoke on the subject of new uses for electric steel castings, explaining that some users of metal parts have not yet realized that steel castings having thin sections can be made by the electric process with considerable reduction in weight and economy in machining and assembling the castings.

The convention was concluded with a banquet at Roycroft Inn, at which E. J. McCone, editor Buffalo Commercial, made an address on the subject of "Americanization of the Employer." He offered the electric steel casting manufacturers some interesting points concerning his efforts in conducting the open shop campaign among newspaper publishers throughout the country.

The fifth of the six furnaces of the Steelton, Pa., plant of the Bethlehem Steel Co., one of the larger blast furnaces, will be placed in operation before the end of April, officials of the plant have announced.

Quad City Foundrymen Discuss Patterns

At the April meeting of the Quad City Foundrymen's Association held on the evening of April 16 at the Moline Chamber of Commerce, Moline, Ill., Herman Heibredner, president Central Pattern Works, Quincy, Ill., delivered a brief address on the "Relation Between the Casting User and the Pattern Shop and Foundry," and George P. Pearce, foundry engineer Union Malleable Iron Works, devoted 30 min. to the discussion of "High Production Patterns," using lantern slides. A profitable discussion followed the presentation of these two papers.

The principal point brought out was that the best results can be obtained by close cooperation, especially where the casting user buys his patterns in a jobbing pattern shop and then has his castings made in a commercial foundry, though it is essential as well as for manufacturing plants where all departments are under one roof. Both the speakers brought out the fact that, in production work, it is not always best to put all jobs on match plates. According to the discussion, the consensus of opinion seemed to be that in many cases patterns are being put on plates that might far better be gated.

To Discuss Foreign Commerce

Foreign commerce will be discussed at the eleventh annual meeting of the Chamber of Commerce of the United States in New York. At the general session on May 8 Willis H. Booth, president of the International Chamber of Commerce, will discuss "European Conditions and American Business," and John H. Fahey, a director of the international chamber, will report upon the Rome meeting of the international chamber.

On Wednesday afternoon, May 9, Mr. Booth will preside as chairman of the foreign commerce group session, at which the discussion will center about the problems and methods of exporting and importing in certain definite and prominent American commodity lines. The phenomenal rise of the automobile in our export trade as well as the importance of American manufactured articles in general in foreign markets will be presented by J. Walter Drake, chairman of the board, Hupp Motor Car Corporation, Detroit.

Mining Engineers to Hold Fall Meeting in Canada

The American Institute of Mining and Metallurgical Engineers has been invited to hold its fall meeting in Canada. The invitation has been issued by the Ministers of Mines of Ontario and Quebec, and by the Canadian Institute of Mining Engineers. The meeting will probably be held during the last two weeks in August. A special train will convey the party to some of the most important mines in the world, including the largest producers of nickel, one of the most productive gold mines, the most famous silver camp and the largest producer of asbestos. The round trip will occupy 10 to 12 days, and technical sessions, as well as sight seeing will be regular features of the program.

The Detroit Foundrymen's Association held its April meeting Thursday evening, April 19, in the Detroit Employers' Association Rooms, Book Building. H. L. Campbell, assistant professor of Metallurgical Engineering at the University of Michigan, gave the talk of the evening on "Foundry Mixtures." Mr. Campbell is in technical charge of the foundry and forge shop at the University of Michigan but his address was entirely from the practical standpoint and received much favorable comment by the attending members.

The Ryan-Bohn Foundry Co., Lansing, Mich., which is operating under the receiver, J. W. Wilford, appointed a couple of months ago, has increased its production from 70 to 125 tons of automotive castings per day.

Routing Work in the Steel Foundry

A System of Records Designed to Prevent Harmful Leaks
—Orders Filled Completely and According
to Promise

BY LARRY J. BARTON*

AS business conditions better themselves, competition increases. This is particularly true of the steel foundry. New shops are resuming operation daily; the standard of work is becoming higher, and it behooves every organization to look to the leaks—those little things which may mean success or failure. Any shop can make good steel castings, but the one which can meet specifications at the lowest cost of production and give the best service is the one which will be the winner.

*Foundry superintendent, Dibert, Bancroft & Ross Co., Ltd., New Orleans, La.

One of the greatest sources of wasted time and actual financial loss today lies in a poor system of routing work and checking production. How often have you promised Mr. Blank 50 center plates for delivery on the first of the month, and when this date comes around, find you have only 45? You check up and, naturally some one is to blame. Quite true, but does this help the good name of the shop? Not at all, and soon Mr. Blank sends his patterns to an organization which will keep its promises.

Or again, have you ever had an order for 100 special castings and, when you are ready to deliver,

Form No. 1

STEEL FOUNDRY ORDER

Order No. 2021 Date April 3, 1923.
 Company Star Mfg Co.
 Delivery Promised May 1
 Specification: A.S.T.M. A 27-16 B Hard

PIECES TO MAKE	PATT. No.	DESCRIPTION
<u>100</u>	<u>652</u>	<u>Gear Blanks</u>

Remarks: Must be heat treated

by J.C.B.

MOLDERS TAG

Order No. 2021 Date in Apr 5
 Company Star Mfg Delivery May 1
 Patt. No. GS 2
 Pieces 100

DATE	MOLDER	TIME	PIECES
<u>Apr 6</u>	<u>J Smith</u>	<u>8</u>	<u>12</u>

PATTERN ORDER

Date Apr 3 1923
 Make 2 Patterns and core boxes for:
Star Mfg Co.
 Their Drawing No. GS 2
 From sample casting ☒
 Remarks: A. B. G.

Our Order No. 2021

COREMAKERS TAG

Order No. 2021 Date in Apr 5
 Company Star Mfg Co.
 Patt. No. GS 2
 Cores to make 100
 Stock Cores None

DATE	COREMAKER	TIME	PIECES

Routing the Order from Its Start Through the Pattern, Molding
and Core-Making Departments

The Log of a Typical Electric Steel Foundry Heat

How the Defective or Short Order Castings Are Kept Track of and the Manner in Which an Order Is Traced

Electric Furnace Heat Sheet			
Heat No. <u>2270</u>	Date <u>Apr 8 1923</u>		
Heats from roof <u>187</u>	Lining <u>187</u>	Bottom <u>2270</u>	
Condition of roof <u>OK</u>	Lining <u>Thin</u>	Bottom <u>OK</u>	
Specification: C <u>35/40</u> Mn <u>60/70</u> Si <u>22/30</u> P <u><.05</u> S <u><.05</u>			
Steel Made: C <u>0.37</u> Mn <u>0.69</u> Si <u>0.24</u> <u>10.042</u> <u>A036</u>			
CHARGE	WEIGHT	SLAG MATERIAL	WEIGHT
Pig Iron	<u>175</u>	Lime	<u>15</u>
Scrap Cast		Lime Stone	
Cast Borings		Shells	
Steel Borings		Floorspar	
Plate Scrap	<u>5250</u>	Sand	<u>75</u>
Shop Scrap	<u>1075</u>	Ground Coke	
Ferro Manganese	<u>45</u>	Magnesite	
Ferro Silicon	<u>20</u>	O. H. Slag	
<u>Aluminum</u>	<u>15</u>	Electrodes	
		Ore	
Total	<u>6566½</u>	Total	
Current on <u>8:00</u>	Current off <u>9:30</u>	Total Time <u>1:30</u>	Time: Ton
Meter after <u>105000</u>	Meter before <u>102500</u>	Total KWH <u>2500</u>	KWH: Ton
Delays and Causes: <u>None</u>			
How is condition of Furnace: <u>OK</u>			
REMARKS: <u>Time of pour 20 min.</u> <u>Conditions good</u>			
<u>Thos Guen</u> <small>MELTER</small>			

DEFECTIVE OR SHORT

Apr 10

Order No. 2021

Company Star Mfg.

Patt. No. GS2

Pieces Needed 2

Why Necessary Mis run

L.O.

6

TRACER ORDER **7**

Order No. 2021 Date Apr 23

Company Star Mfg

Patt. No. GS2

Pieces to Make 100

Pieces Short 12

T.P.

find 105? Of course you have, and you can figure, in many cases, nearly enough loss from the mistake to counterbalance the entire order's profit.

There is yet another side—keeping track of defective castings. Do you, at all times, know what has been lost, who lost it, and why? If not, your organization needs checking up. Lost castings, over orders and unkept promises have sent many a good shop to the receiver's court.

So much for the pessimistic side. During the past few years it has been the writer's duty to organize several shops on a production basis. From this experience a system has been evolved, which is extremely simple, yet works to perfection. While it is true that conditions are different for various localities, the writer

is offering his result in the hope that some may profit, even though it be but one shop.

The routing of work naturally starts in the office where all orders are taken. There should be only one man, or his assistant, who has the authority to take orders, make prices, etc. This prevents anyone from making unofficial statements, avoids argument and centralizes this important operation.

We will assume Mr. Brown, the order clerk, has received an order from the Star Mfg. Co. for 100 gear blanks. He will make out form No. 1 as shown (Fig.

1). This is in three colors; white for the original, pink for the duplicate and blue for the triplicate. He files the white copy and places the other two in his route basket. A boy picks these up at regular intervals and takes both copies to the foundry superintendent's desk. These are both initialed by the superintendent. One is sent to the shipping clerk who places it on a file. The other is given to the foundry clerk.

The foundry clerk then checks the patterns and core boxes. If there is no pattern, he reports back to the foundry superintendent who makes out a pattern order, form No. 2 (Fig. 2). This is made in duplicate; the original, white; the second sheet, pink. The white is filed in the office of the superintendent and the pink is sent to the pattern shop. When the pattern and core boxes are finished, the pattern maker's time is jotted on the back of this order and returned to the superintendent, initialed and sent to the cost clerk.

The foundry clerk then takes the patterns and core boxes, makes out two tags, one for the molders, which is blue, and one for the core maker, which is pink. These are tacked to patterns and placed on the "IN" shelf.

The order, which the foundry clerk had, has now been placed on the foundry foremen's desk. If he desires a certain molder to make the job, he will tell him. If not, the pattern is left on the shelf until some molder runs out of work; he will then start the job. He will put his name on the card and fill out at the end of every day, as shown.

As soon as the complete 100 pieces have been molded, he turns his card in to the foreman. The pattern is then placed on the "OUT" shelf and is later returned to the pattern storage department.

As all castings are poured and shaken out, they go to the cleaning room. The cleaning room foreman checks up what is coming, dates of delivery, etc., by the shipping clerk's order. As the castings are cleaned, they are turned over to the shipping clerk and checked and prepared for shipment. This is the theoretical operation, but there are yet several other points to consider:

1. *Specifications and Making the Steel:* The metallurgist keeps tab on the superintendent's file for the special work coming along. On this particular order he notes that "hard" castings are being called for; he takes the necessary step to keep in touch with the molders' foreman to see that the proper steel is cast for this order. If he has a full heat of "hard" metal, all right; if not, he may have to pour part of the heat and re-carbonize enough left in the furnace to pour this job. He then follows this through the annealing process and, later, the heat treatment. A typical furnace sheet for a heat of this character will look as shown in Fig. 5.

2. *Defective or Short Order:* This is made out by the cleaning room foreman and given to the molders' foreman for every defective casting received, enabling the order to be filled at once. The molders' foreman will keep a record of these, and each week can check up and find out why castings are being lost, and who is to blame. If he finds a certain molder is an habitual offender, he will do well to eliminate him. Troubles in gating, size and position of heads, condition of sand and many other points of trouble can be quickly remedied by a close check on these "wasters." The actual result of this system in one shop was to cut down the losses from 8 per cent to under 1 per cent in less than one month. Should a casting be found defective on the molding floor, due to a run out, etc., the molders' foreman must make out a slip so that an accurate record may be kept all around.

3. *Tracer Order:* Suppose along about April 23 the Star Mfg. Co. rings up to learn if they can obtain part of their order at once. The order clerk makes out a tracer order, as shown, which goes first to the shipping clerk, who notes on the back how many finished pieces he has. It then goes to the cleaning room foreman who notes work in course of cleaning, as does the molders' foreman. This slip then goes back to the order clerk, who can telephone the inquirer as to the exact status of his order.

There is yet another use for this blank. About a week before delivery is due, the shipping clerk starts the tracer to see how the order is coming along. Information is quickly obtained as to pieces cast, those being finished, those in the sand and yet to be molded. Many a time the molders' foreman thinks an order is out, and is suddenly brought up by a tracer showing two or three short. This has saved many a promise.

4. *Foundry Clerk's Daily Sheet:* This is a form made out daily by the foundry clerk, showing pieces cast in each order during the day, pieces needed to complete order, etc.

This system can be developed in a more complete manner, if desired, taking in annealing, heat treating, etc., so that an exact record of every piece cast can be kept, covering analysis of metal, method of molding, annealing, physical tests, etc. This, however, is not usually practiced, except on very special work sold on a guarantee, such as dredge buckets, sugar mill rolls, etc.

While this system entails some clerical work, it is my belief that this is more than paid for by the added efficiency and elimination of lost motion.

When a "hard" customer rings up about an order and, inside of 30 min., you ring him back telling him that, while your promise has yet five days to run, you already have 95 of his order cleaned, ready to ship and the other five will be ready by next morning, complete satisfaction reigns and a duplicate order often follows.

The Right and Wrong Method of Checking Used Thermocouples

A thorough discussion of the right and wrong methods of checking the thermocouples used in pyrometric work was presented before the April meeting of the New York Chapter of the American Society for Steel Treating, Wednesday evening, April 18, by C. H. Wilson, of the Wilson Maule Co., New York. It was the consensus of opinion of several metallurgists present, who were able to pass judgment, that Mr. Wilson's presentation of the subject really registered a landmark in the discussion of the subject. The address having been more or less extemporaneous, he was requested to recast his speech in the form of a paper which could be made available for those interested.

Briefly, the speaker confined himself to the discussion of used pyrometers and went minutely into the details of present methods of checking the thermocouples after they had been used on a commercial scale for some time. Pointing out the unreliability of much of the work as it is now done and discussing the condition of the metal in the thermocouples and how it must differ from a new or fresh instrument, the author explained the theory on which such instruments worked and pointed out the various conditions which can impair their correctness. He was very emphatic in his condemnation of some of the quite generally prevalent methods of checking used pyrometers which involve the chilling point of various salts, such as sodium chloride, etc. He insisted that the only proper way to correct the used pyrometer was to check it with a standard pyrometer under the actual conditions under which it is being used. The talk was illustrated by blackboard sketches and the discussion which followed was animated and instructive.

Sand and Molding for Automobile Castings

Quantity Production at Plant of Wilson Foundry & Machine Co., Pontiac, Mich., Aided by Specially-Designed Machinery

BY HENRY M. LANE*

AS all castings have to start with the consideration of the raw material we will start with the sand end of this plant, and will consider the metal end later. The sand storage building is 80 ft. wide and 390 ft. long, and has a sand storage capacity of 700 cars of molding and core sand. The cars come in on a track adjacent to the end of the building, and the sand, unloaded by the grab bucket on the crane, is carried in and distributed into the various bins. The mixing room occupies a space 40 ft. wide by 80 ft. long, extending across the sand storage building.

The crane which serves the sand storage also crosses the tracks and serves to supply fuel to the heating plant. This crane and grab bucket unloads all of the coal, piles it in stock piles, and handles it from the stock piles to the heating plant. It also not only puts all sand into storage, but takes all sand out of storage and supplies it to the mixing machines, or loads it into the dump carts to be hauled to the facing department, or to the foundry for distribution on the sand heaps.

The two grades of core sand used are stored on opposite sides of the core sand mixing unit, and the molding sand is stored at the farther end of the building. Originally the sand mixing machinery and equipment consisted of two units, each essentially like that shown in Fig. 1. This consists of a Standard Sand & Machine Co. batch mixer, elevated, and arranged with a floor feed hopper. In the old arrangement the sand was taken from the bins through doors in the retaining walls at the sides of the mixing room, loaded into carts and dumped into the hopper. A batch was made up in the hopper and then delivered to the mixing machine by the bucket elevator shown. Oil was then added from a little tank at the end of the mixer beyond the conveyor, the measured amount being forced in by compressed air. Where water is necessary in the mix a measured amount of this is also forced in, being distributed through a spray pipe along the top of the mixer.

Careful experiments have been made to determine the proper mixing time for each batch and the machine

operator has a clock which enables him to determine the time before the discharge gate is opened. The material is then drawn out into delivery carts as shown under the machine in Fig. 1. The mixed sand is delivered to the core makers' benches. The more recent installation of equipment is shown in Fig. 2. In this case the mixer formerly used in connection with a unit like that shown in Fig. 1 was surmounted by a double hopper bin. Each end of this bin contains

a different grade of sand and under each bin there is a measuring gate that will contain a certain cubic content of sand. An air cylinder serves to operate this gate and delivers into the mixer a measured amount of sand. The batches are made up with the content of this gate as a unit, and for certain mixes it may be necessary to move each gate five times, which would give as the total mix ten times the amount delivered at one stroke, or any other ratio between the two ingredients which may be worked out.

The oil and water are forced in under compressed air by displacement, as already mentioned, the spray pipe being along the back of

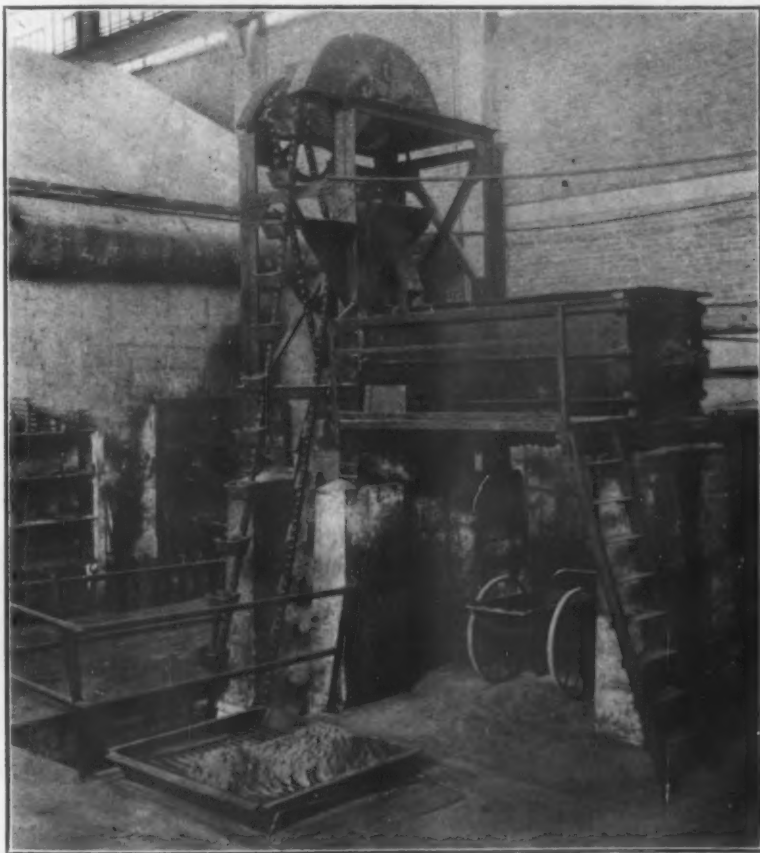


Fig. 1—Sand Mixing Machine with Floor Hopper

the mixer at the top. Sand coming from the discharge gate of the mixer falls directly into the carts, and is taken to the core room as already described.

The arrangement of hoppers over the sand mixing machines, the delivery of sand into these hoppers with the grab bucket, and the feeding of the mixing machine by the pneumatically controlled gates has reduced the expense of mixing sand about 50 per cent, when compared with the old method of floor hoppers, which necessitated shoveling the sand into the carts and its subsequent dumping into the hopper.

While on the subject of sand it may be well to say something about the mixing of facing sand for the foundry. Facing sand consists of a certain portion of old sand and a certain portion of new sand, and the sea coal and other ingredients required. The new sand from the sand bins is brought in in dump cars by means of a tractor, the dump cars having been filled by the grab bucket in the bins, and the new sand is dumped on the floor as shown at the right of Fig. 3. At the left will be seen a battery of three 6-ft. Simpson mixers with loading devices. The first two loading devices are down in the filling position and the

*Industrial engineer, Detroit. This is a portion of a paper read by Mr. Lane before the National Foundry Association. Other portions have been published at page 745, March 15, and page 1037, April 12.

one in the background is raised to discharge its load into the mill.

A measured amount of old sand is dumped into the hopper and this is followed by a measured amount of new sand, then the sea coal and other ingredients for the mix. The loader is then elevated, whereupon the contents are dumped into the mill and the mixing is continued by clock for a predetermined time.

Then the discharge side of the mill is opened, which discharges the sand onto a belt conveyor back of the mills, the end of which can be seen at the extreme left of the picture. This belt conveyor carries the sand toward the right to a point where it is taken on by a bucket elevator and discharged on to a drag conveyor running over the bins, at the extreme right. The facing sand is drawn from these bins into carts and wheeled to the floor requiring it.

The wetting necessary for the facing sand is added in the mill, and great care is taken to see that the proper amount of water is used in the tempering. All of the features entering into the mixing of both core sand and facing sand and all of the binders and other ingredients are under laboratory control and supervision. This makes it possible to get uniform results.

We now proceed to the foundry and to the molding of Model 4 Overland cylinders. This particular job

relationship between the crane and the machine. This really consists of two crane frames joined together by suitable steel work, and supporting two underslung pneumatic cranes carrying air hoists. The trolley travel of the air hoist is parallel with the travel of the Beardsley-Piper machine or, in other words, with the length of the floor.

This machine has ramming positions for both cope and drag portions of the mold. The flasks are placed in position and rammed successively. One of the air hoists then picks up the finished portion of the mold, and sets it on the floor, as shown in greater detail in Fig. 5, which is taken from the opposite side of the machine. In this view it will be noticed that the two special molding machines or pattern drawing devices, which the Beardsley-Piper serves, are mounted on rolls and dragged along with it. The drags are set down on the floor in a row, and on the row of molds already set are placed wooden platforms, as shown.

Each one of these wooden platforms is first loaded with a complete set of cores to core the mold in front of it. The coring gang then proceeds along the row of drags, assembling the cores in the molds, and testing each stage in the assembly with suitable jigs. In the left foreground can be seen a mold which has just had

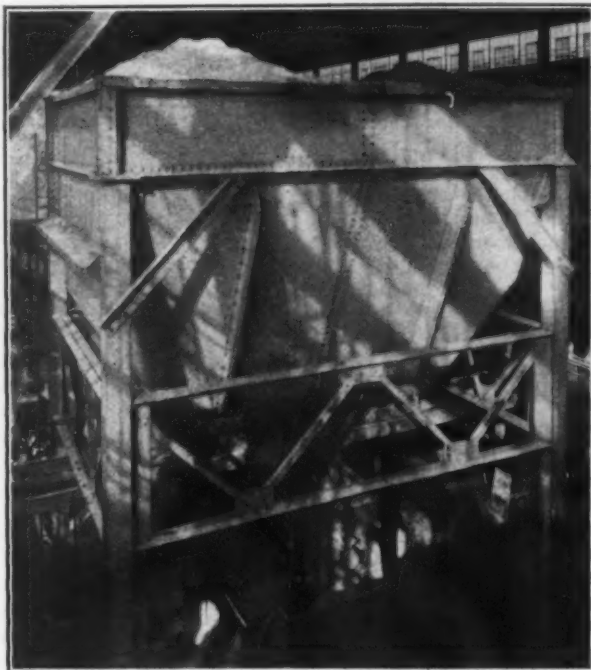


Fig. 2—Sand Mixing Machine Surmounted by Hopper with Measuring Gates

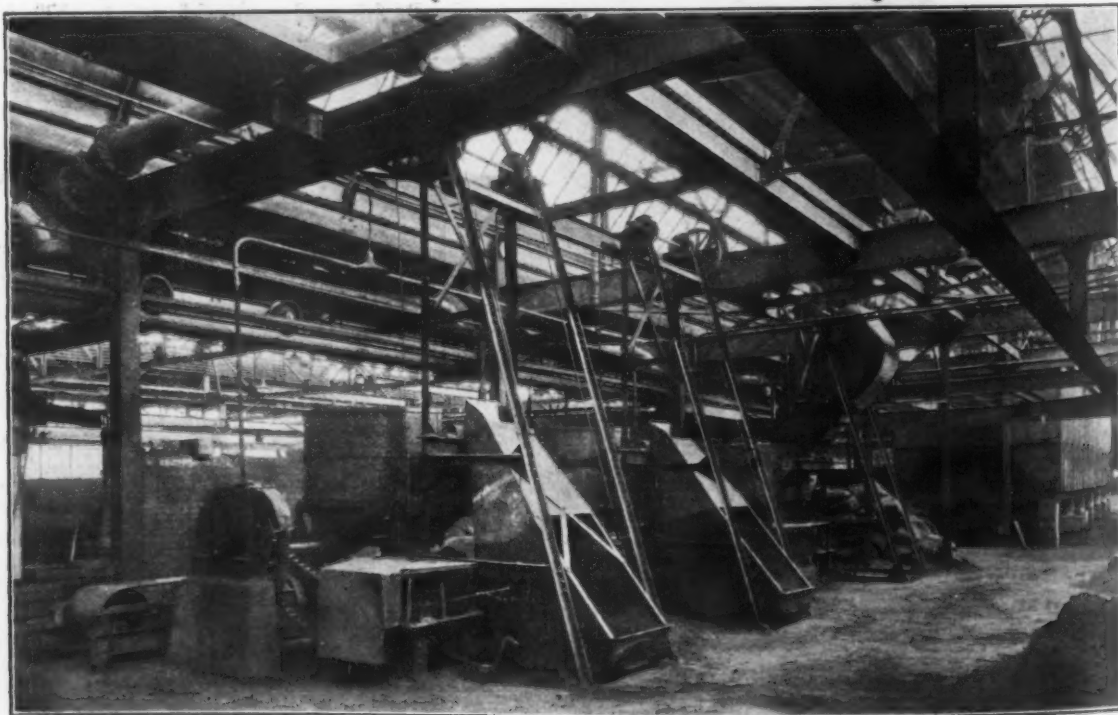


Fig. 3—Facing Sand Mixing Department

is being molded on a Beardsley-Piper sand slinger machine, a general view of the floor being shown in Fig. 4. The machine advances into the sand heap, picking up the sand, riddling it, and delivering it into the mold. Particular attention is called to the special traveling crane arrangement following the Beardsley-Piper machine, and attached to the machine by a lead chain, so as to maintain a constant re-

lationship between the crane and the machine. This really consists of two crane frames joined together by suitable steel work, and supporting two underslung pneumatic cranes carrying air hoists. The trolley travel of the air hoist is parallel with the travel of the Beardsley-Piper machine or, in other words, with the length of the floor.

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Fig. 5—Detailed View of Coring Arrangement for Model 4 Overland Cylinders

subsequently done with another crane and bull ladle.

In connection with the Beardsley-Piper machine, fourteen men ram up, core, and get ready for pouring 300 cylinders in 9 hr., and the machine handles 3500 cu. ft. of sand per day, or about 161 tons.

The Overland Model 4 piston is an all-green-sand job, and the rigging for accomplishing this is shown in Fig. 6. At the left is shown a specially rigged Buch's molding machine with a special core box rigging on it, in connection with which the bosses in the core box can be withdrawn or stripped out over the sides before the flasks are drawn down away from the patterns. The two completed drags are shown at the left, as the machine makes two drags at a time, and each contains four pistons.

At the right is shown a small stripping plate machine used for making the copes, and in the center of the picture is shown one of the copes. This group

of machines makes very rapid progress in producing this type of piston. The use of green-sand piston cores takes a big burden off the core-room, and the absence of dry sand cores gives a longer life to the sand heap. The accuracy of these methods of molding can be judged by the fact that all finished pistons are kept within a total limit of 1 ounce in weight.

One feature which will be of interest, even though it is outside of the foundry work proper, is the treatment of the Willys-Knight sleeves. As has already been stated, the greatest care has been exercised in the molding and metallurgy of the sleeves. They are then rough turned, and subsequently passed through an annealing oven, a view of which is shown in Fig. 7, with a carload of sleeves in the doorway.

This annealing oven really has two functions to perform: In the first half of it, castings are brought up to a temperature of 800 deg. Fahr., and in the

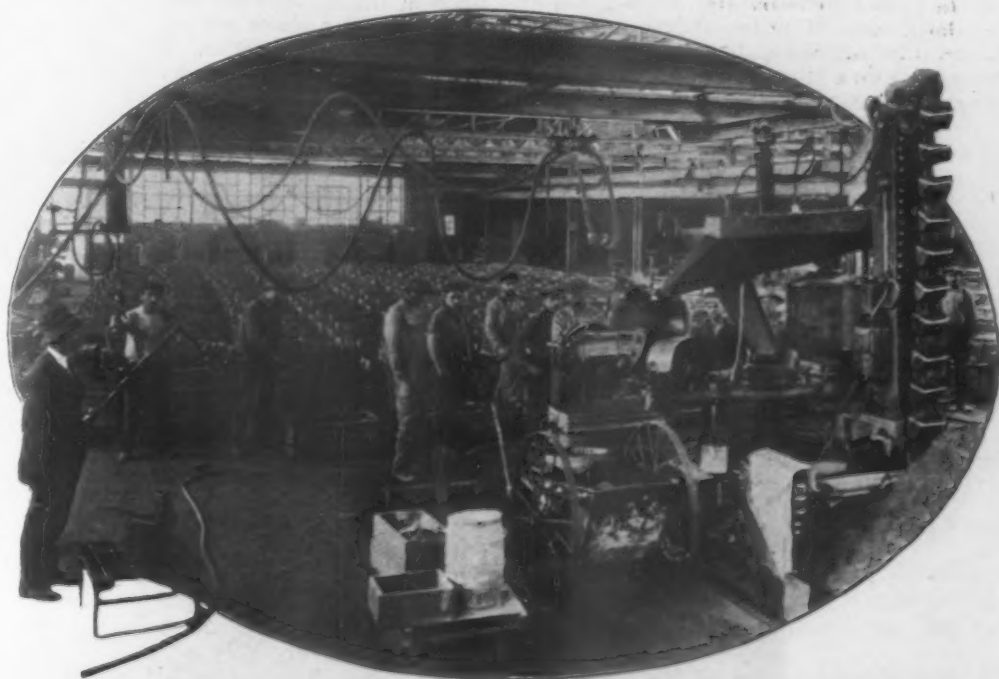


Fig. 4—General View of Beardsley-Piper Sand Slinger Molding Machine on Model 4 Overland Cylinders

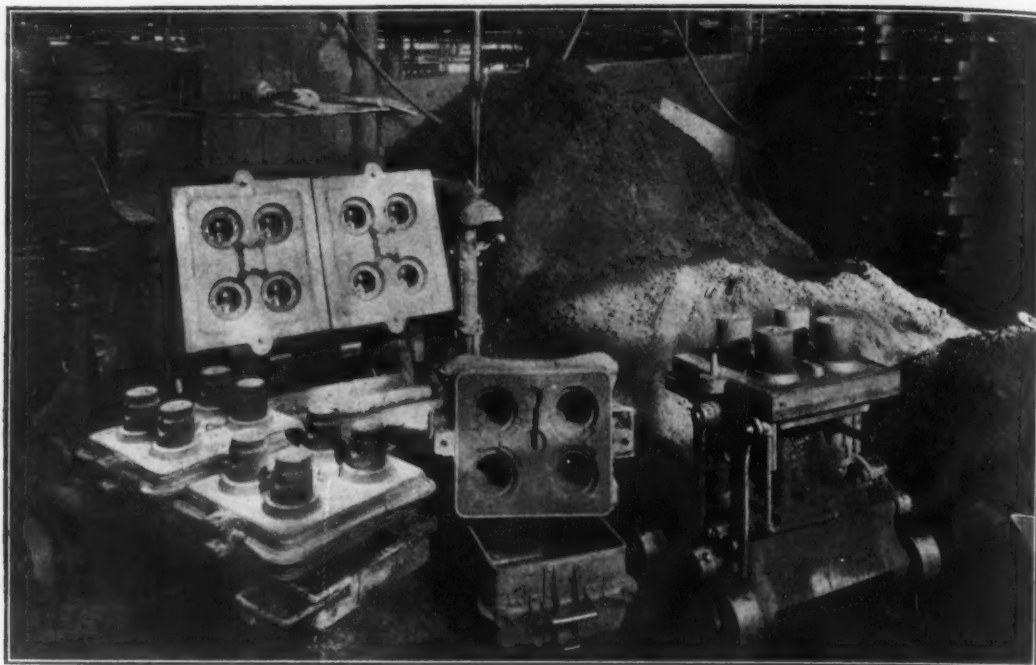


Fig. 6—Rig for Making Green Sand Mold for Model 4
Overland Pistons

second half they are cooled to such a temperature that they can be handled comfortably when they come from the oven, and they then pass directly into the machine line-up for finishing. The oven is a continuous affair, being loaded at one end and discharged at the other. This low temperature anneal has the effect of aging the castings, which relieves strains and results in a more perfect finished product.

The aluminum castings necessary are also turned out in this plant. The principal cores for these molds are made in green sand entirely. As all of the practice in this division of the foundry follows the same accuracy in regard to machine work that is practiced in the iron foundry, it is unnecessary to multiply the pictures and descriptions of equipment. All aluminum pistons are made with green-sand cores, following the general practice already outlined for gray iron.

Coke Prices Established for France

WASHINGTON, April 24.—A definite schedule of prices for coke to extend through May has been established in the French iron and steel industry and as a result the sliding scale of prices of iron and steel, according to the price of coke at the time of delivery, is disappearing, according to a cablegram received by the Department of Commerce from Commercial

Attaché Chester Lloyd Jones, Paris. The effect has been to stabilize the market. The schedule was set by the Société des Consommateurs de Cokes de Hauts-Fourneaux. It is stated that 20 per cent of the coke requirements will be supplied to blast furnaces at 198 fr. per ton, while remaining needs will be furnished at 310 fr. per ton, which are considered high prices, but it is expected that there will be a revival of the industry because iron makers are now given a definite figure on which to base estimates. Improvement in supplies of coke from the Ruhr is reported.

The cable adds: "The pig iron market is strong, with few producers quoting, but several blast furnaces have recently been blown in. Firm quotations on pig iron are being made at 500 fr., f.o.b. furnace; prices on hematite pig are easier and sales are reported at 550 fr., f.o.b. furnace, with plants in central France quoting 530 fr.

"The steel market shows improvement and manufacturers of semi-finished products are again in the market. Orders for structural shapes are being booked at 750 fr. per metric ton, f. o. b. mill. The plate market is active, with orders for plates being placed in Belgium and England and orders for sheets in England. Five millimeter plates are now selling at about 900 fr. and merchant bars 800 fr. Mill prices are not profitable but manufacturers prefer to accept them in order to keep their workmen employed."



Fig. 7—Continuous Car
Type Annealing Oven for
Willys-Knight Sleeves

Acid Electric Steel Furnace Operation

Iron Oxide a Controlling Factor—Its Reduction from an Acid Slag—Method of Charging Scrap

BY J. M. QUINN*

ASSUME that an acid furnace has been thoroughly dried and is ready to make a heat of steel. It is not absolutely necessary that the furnace be preheated before scrap is charged, although it is sometimes well to gradually warm it up so as to reduce to a minimum the checking or spalling of the silica brick.

The first consideration in charging the scrap into the furnace is that the total phosphorous and sulphur be slightly below the high limits of the specifications, that is under 0.05 per cent. Any steel scrap or mixtures of scrap which are small enough to go through the furnace doors conveniently may be used so long as the carbon in the metal on melting down is not too high, the usual desired limits being between 0.20 to 0.40 per cent carbon.

Charging the Scrap

Quicker melting down periods are obtained when all the scrap is charged into the furnace at one time, the usual practice being to place large or chunky pieces on the bottom under the electrodes to help form a pool of metal when the electrodes eat their way through the balance of the scrap which is then shoveled into the furnace. Three or four charges of light bulky scrap to give the required weight are not usually profitable, as the tons produced per hour are reduced materially. When using a large proportion of low carbon steel in the charge, such as punchings, boiler plates, etc., care should be used to distribute this scrap throughout the charge to prevent its welding into a semi-solid mass and bridging across the furnace (especially with furnaces small in diameter) and delaying the heat.

Again low carbon steel is not usually charged on the furnace bottom as a 0.10 per cent or under carbon steel has a higher melting point than a 0.25 to 0.35 per cent carbon steel and might freeze on the bottom, which is the coldest part of the furnace hearth and prolong the heat. Foundry "returns," with adhering sand, (a poor conductor of electricity) when cold should be placed in the furnace so that there is intimate contact between the pieces of scrap to carry the current, otherwise trouble will be experienced starting the furnace. In a case of this kind, a piece of broken electrode placed under one or all electrodes will sometimes give good contact, or a bridge of clean scrap or electrode between electrodes will start the arcing.

Should the scrap be very rusty and free from sand, or also where a large amount of ore or mill scale is added with the high carbon scrap, it is good practice to shovel in some clean silica sand when the furnace has been operating steadily for a short period; otherwise the slag, containing a large proportion of iron oxide, which is basic, will cut the furnace hearth until it has satisfied itself with silica.

Iron Oxide a Controlling Factor

The controlling factor in the operation of the acid process seems to be the quantity of iron oxide present

at the time the heat is melted, irrespective of whether this oxide is introduced with the steel scrap as rust, or whether it results from oxidation due to air leaks in the furnace or from the addition of iron ore. The slag volume is controlled directly by the action of this iron oxide and silica. If a portion of the charge consists of foundry returns, such as gates, risers and bad castings, with the usual amount of sand adhering to them, it is most likely additional silica sand will not be necessary.

Experienced furnace operators can proportion the scrap charges, maintaining fairly uniform melting practice heat after heat. In many plants the slag or melting down is green and the metal completely deoxidized within 10 or 15 min., even when iron oxide is charged with the scrap. However, whether intentionally or not, these heats usually contain a considerable percentage of manganese in the charge, which is highly desirable. Where the initial manganese is low, some operators add ferromanganese, manganese steel scrap or manganese ore with the scrap when a high quality steel is specified.

If, because of some unforeseen cause, the carbon in the first test is very high, say 1.00 per cent or over, it is sometimes well to pour the heat into pigs or some other form which can be charged into the furnace from time to time in successive heats and then start a new heat. Should the test piece fracture look lower in carbon and it is decided to work the heat, care is now necessary in the addition of ore or scale for decarburizing the metal, because this is an endothermic reaction, absorbing heat and requiring a high degree of temperature for a vigorous reaction between the oxygen of the ore or scale and the carbon of the steel.

If the addition of these oxidizing agents is made in too large a quantity, the chilling effect may so retard the reactions that, when finally the high temperature required is reached and the bath goes into a boil, the evolution of gas will be so great as to cause the metal to boil violently and come out the doors. After the first "shot" of ore or scale, no reaction or boil will occur for a short time, as explained above, but the furnace must be watched closely during further additions. However, when the action is violent, shut off the power and open all doors; this will cool the furnace and quiet the action.

When the carbon is slightly above the specified amount, no further additions of oxides should be made; in that way the carbon will come down, gradually shaping up the heat at the same time. Should the decarburization be carried below the carbon aimed at, additions of spiegel, pig iron or pieces of electrode are necessary to rectify the mistake and, while the damage is not serious, the greater the additions of recarburizing agents the greater will be the amount of silicate of manganese produced.

Volume of the Oxidizing Slag

When the volume of the black or oxidizing slag is large in proportion to the weight of the metal, which would occur after decarburizing, this slag is removed

*This article is a continuation of one entitled "Lining Acid Electric Furnaces," published in *THE IRON AGE*, April 19. The author was formerly superintendent of electric furnaces, United States High Speed Steel & Tool Corporation, Troy, N. Y.

¹ and ² "Making Acid Open-Hearth Steel," B. E. L. de Mare, *American Iron and Steel Institute*, May 23, 1920; *THE IRON AGE*, June 2 and 10, 1920.

from the furnace and a new slag made with clean silica sand. A test taken will show the characteristic "worm" or "blow holes" indicating oxides in the metal. Should the slag remain black, deoxidizing agents such as fine coal or coke are thrown on it, which reduces some of the iron and manganese in the slag.

But these reactions may not be carried to the complete reduction of all the iron and manganese, for, after the silica in the slag is increased to 55 or 60 per cent, further reductions of the other metals, also reduced silica and the silicon, go into the steel.

Whereas during the melting of the charge on account of the low temperature then prevailing, the oxidation of the silicon² goes on at a much greater rate than the oxidation of the carbon with the steadily increasing temperature, a complete reversal takes place, so increasing the affinity of carbon for oxygen that it

formed thins the slag and has a tendency to cut the hearth at the slag line. Aluminum is the most powerful of the usual deoxidizers and has been used in extreme cases where exceptional difficulties were encountered with the metal. The alumina (Al_2O_3) formed combines with the slag.

Reducing Iron Oxide from an Acid Slag

Views regarding the reduction of iron oxide from an acid slag not quite in agreement with the writer's opinion are noted here as a matter of general interest.

Iron oxide cannot be appreciably or satisfactorily reduced from the slag by adding coal or coke dust as in the basic process for two reasons. First, a silicate in which the acid constituent is in excess is more difficult to dissociate than a silicate in which the bases are in excess as in the basic process, and further the iron is more stable in a silicate in which iron base is the predominating base, as in the acid process. In the basic process, with CaO and MgO the controlling bases in a basic silicate, iron oxide whether free or combined with the other bases as a complex silicate, is easily reduced by coal or coke.

The second reason why it is impractical, and perhaps impossible to reduce the FeO from the acid slag by coal or coke is that at the high temperature in the vicinity of the arcs, SiO_2 is reduced by carbon. This phenomenon is familiar in the Bessemer process where when a certain high temperature has been reached, silicon in the bath increases during the blow.

In the acid process, therefore, if the slag is subjected to reducing conditions before it is of the proper composition, silicon will be reduced and the bath will contain a percentage of silicon varying with the intensity of these conditions and their duration.

As the iron oxide is reduced with difficulty it must therefore be replaced by a stronger base. This is partially accomplished by the addition of lime. Manganese ore, if free from iron, should also be used for the same purpose. It is by replacing iron in the slag with calcium and manganese that it is possible to produce the necessary reducing conditions and secure uniform retention in the bath of subsequent manganese and silicon additions. Fortunately a slag with the proper percentage of lime and manganese can be determined by its appearance.

Similar to an Open-Hearth Slag.

An oxidizing acid slag such as obtained after melting down is black and opaque or slightly glassy, similar in all respects to a common acid open-hearth slag which it really is, chemically and physically. As soon as a heat is melted and the carbon is observed to be sufficiently low, lime should be added immediately up to 20 or 30 per cent of the slag volume; also it is preferable to add manganese ore sufficient to give 10 to 15 per cent MnO in the slag. When the slag contains sufficient lime for practical purposes it will no longer be black but will turn to a green or robin's egg blue and when cooled in the air, the surface will turn black or brown depending upon the proportions of iron and manganese oxide, black if it contains too much iron oxide and brown if the iron oxide is sufficiently removed.

Coke dust or coal should be used during the interval of adding lime and manganese ore, and until the heat is tapped to prevent any further oxidation of iron. If all the constituents of the slag are actually combined with nothing in suspension and the furnace is free from air leaks and working under a normal reducing atmosphere, a translucent, almost transparent, glassy slag of yellowish green or greenish blue is obtained. With this transparent slag and the greenish blue slag coated with a chocolate brown, reducing conditions are the best that can be obtained by the acid process. Subsequent additions of manganese and silicon will result in uniform losses and therefore give uniform results in the finished steel with respect to those elements.

A typical analysis of a proper finishing slag is as follows: SiO_2 , 58.70 per cent; CaO , 21.25 per cent; MnO , 12.01 per cent; FeO , 3.10 per cent; MgO , 1.15 per cent; Al_2O_3 , 3.35 per cent; P , 0.003 per cent; and S , 0.005 per cent.

If the slag during these operations shows a tendency to be porous or spongy it is still in an oxidizing condition. A proper acid slag should be free from sponginess or indications of gas pockets.

In contradiction of the foregoing, the writer has seen many heats of acid steel made where ore was

ACID ELECTRIC FURNACE OPERATION

Procedure used by a Western steel foundry for making steel with a 2½-ton acid lined electric furnace where all metal is poured into tea pot bottles.

10:00 a.m. Charged: Steel shells .. 2,000 lb.
Steel springs .. 600 lb.
Own return ... 1,400 lb.
Heavy turnings 1,000 lb.

Total scrap .. 5,000 lb.

10:05 a.m. Power on.

11:40 a.m. Melted down.

11:42 a.m. Made test; metal cold and rose in mold; slag black and running; preliminary test 0.34 per cent carbon and 0.25 per cent manganese.

11:50 a.m. Added shovel of coke.

11:55 a.m. Test O.K.; metal hot; slag green and heavy.

12:00 a.m. Added 35 lb. of 80 per cent ferromanganese; 2 lb. of aluminum and 25 lb. of 50 per cent ferrosilicon as the metal was flowing into ladle.

Analysis of heat, per cent:

Carbon	Manganese	Sulphur	Phosphorus	Silicon
0.22	0.56	0.033	0.042	0.32

is able to reduce silicon out of the SiO_2 , leaving the silicon free in its nascent and, therefore, most efficient state to deoxidize the steel as shown by the increasing solidity and freedom from blow holes of subsequent tests.

This reaction is the essential point that accounts for the difference between acid and basic steel and one of the reasons why some people claim acid steel is superior to basic. The fact that oxides in the slag mean oxygen in the steel should be kept in mind so that, when iron, manganese and silicon are reduced out of the slag and enter the steel, more oxides from the steel are taken up by the slag, which are in turn reduced. As the basic oxides in the slag get lower, the slag gets lighter in color, and also as the oxides in the metals are lowered, the metal is quieter and sparkles less when a spoonful is poured out.

More expensive reducing agents are sometimes used, the slag being bleached by crushed 50 per cent ferrosilicon of which one pound will do as much bleaching as four pounds of carbon. This silicon reacts with the oxygen similar to the silicon reduced under the arc from silica. Ferromanganese can also be used to bleach the slag, but is not as effective as silicon, and there is more danger of the alloy getting into the metal. When used, the oxide of manganese, MnO ,

² See footnote on page 1177.

³ "Notes on Acid Electric Furnace Practice," Blast Furnace and Steel Plant, December, 1919.

used for reducing carbon and then only coal or coke used to deoxidize the slag and metal; further, the final steel was of high quality. However, we do agree that the judicious addition of burnt lime, CaO, to an acid slag aids in reducing the oxides. The lime displaces iron oxide from the slag and combines with its equivalent of silica. The iron oxide expelled either passes into the metal, which is then reduced by the carbon of the metal, or is reduced by the carbon thrown on the slag.

It is generally conceded that the yield of manganese obtained in the steel bath from added ferroalloys, all variables considered, is proportionate to the CaO per

eration is delayed because any one of these three points has not been attained, the delay will be attended with much difficulty because of a pasty, unwieldy slag and constantly increasing silicon content in the steel.

Of course, there is no steel, acid or basic, absolutely free from oxides, nor is there any other steel, no matter by what process made, which under the microscope does not show oxide spots. However, the most complete deoxidation of the metal is secured with the attaining of a high temperature, for the hotter the metal the more completely may it be degasified. When this high temperature is reached and the final alloy additions made, the metal should be poured from the furnace quickly, and if too hot to pour, it can be held in the ladle until ready, otherwise the slag will become thick and unwieldy.

Practically all plants have specified 4oz. to 1 lb. of aluminum per ton of metal to be added in the ladle as the metal pours from the furnace, even though the alumina formed has the faculty of remaining in the steel as slag inclusions, unless the steel is held long enough for the alumina, which has a low specific gravity, to rise to the slag. Some others use 3 or 4 lb. of ferro-carbon-titanium per ton of metal when the steel is re-ladled into "bull" ladles for pouring small castings to take care of the reoxidation of the metal by the air as it passes from one ladle to the other. Aluminum and titanium-calcium-silicide and other combinations of reducing agents are used as final deoxidizers and each has its advantage.

ACID ELECTRIC FURNACE OPERATION

Procedure used by a Northwestern steel foundry for making steel with a one-ton acid-lined electric furnace where all metal is poured into bull ladles.

9:45 a. m. Charged: Shell ends..... 573 lb.
Plate scrap ... 923 lb.
Steel punchings 547 lb.
Own returns... 707 lb.

Total scrap... 2,750 lb.

9:50 a. m. Power on.
11:15 a. m. Melted down.
11:20 a. m. Made test; metal cold; slag black.
11:22 a. m. Charge hard ore..... 12
11:26 a. m. Bath boiling.
11:29 a. m. Power off to remove slag.
11:32 a. m. Power on; added 4 shovels silica sand.
11:48 a. m. Made test; metal hot; fracture O. K.; slag thin and green.
11:50 a. m. Charged 80 per cent ferromanganese 28
11:55 a. m. Charged 50 per cent ferrosilicon 22
12:00 p. m. Poured first ladle.
12:05 p. m. Power off.
12:10 p. m. Finished pouring 20 ladles. To each ladle 8 oz. of ferro-carbon-titanium and ½ oz. aluminum was added.

Analysis of heat, per cent:

Carbon	Manganese	Sulphur	Phosphorus	Silicon
0.26	0.59	0.041	0.026	0.30

Test piece showed the following physical properties after annealing:

Tensile strength, lb. per sq. in.....	71,800
Elastic limit, lb. per sq. in.....	50,600
Reduction of area, per cent	20.0
Elongation in 2 in., per cent.....	21.5

cent (or its equivalent of similar basic material) in the slag.

Lime for Thinning Slags

One large producer of acid electric steel uses lime primarily to thin highly silicious slags, but limits the CaO to 8 per cent of the total slag volume, while others have had the CaO content of the slag run over 20 per cent with good success. Whenever burnt lime is used, it is advisable to mix it with some silica sand before shoveling it into the furnace and thus reduce to a minimum the action of lime vapors on the side walls and roof with the resulting increased slag volume.

Let us now assume that the furnace operator has used the greatest care throughout the heat and is successful in accomplishing three things¹ simultaneously, complete deoxidation of the steel, proper metal analysis and the proper pouring temperature, then the manganese and silicon can be added and the heat tapped within 5 to 10 min. If, however, the finish of the op-

Purchasing Agents Believe Steel Prices Will Advance

Price tendencies as indicated by a referendum canvass of 140 buyers of various commodities were charted at the monthly meeting of the Purchasing Agents' Association of New York, held on April 17. The ruling opinion was reached by a showing of hands to indicate whether an individual believed the price of a given commodity would go up or down, and whether he would buy for a period of three months or six months. Steel, it was voted, would advance and several advised buying for a period of three months. In the case of lumber and paper, the unanimous opinion was that the prices will go up on short notice and that buying should be done now. There was a marked division of opinion on fuel oil, the majority believing that the tendency is downward. Very few advised buying for any period over a month. Those interested in copper expressed the belief that it will go up, and the advice was to buy for a period of three months. The experiment proved so interesting and successful that it was decided to make it a regular part of future meetings. A. E. Crockett of the Jones & Laughlin Steel Corporation addressed the meeting on "The Steel Market."

Hearings at Chicago Concluded

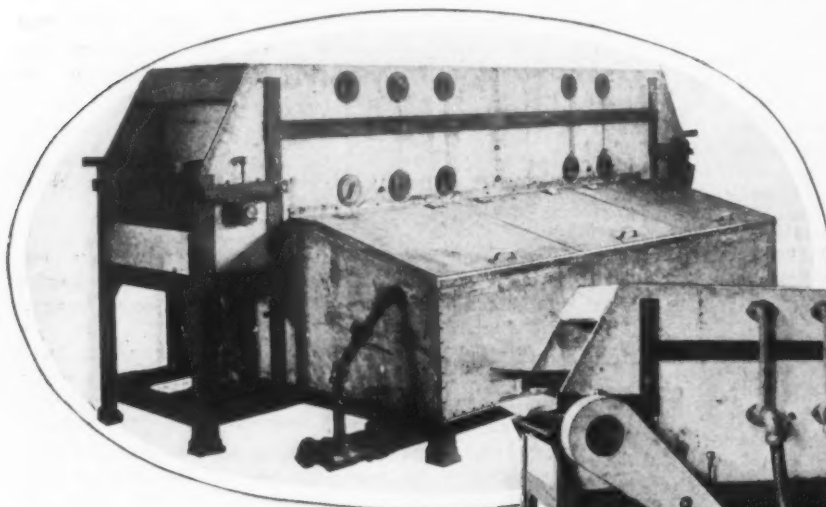
CHICAGO, April 19.—Hearings before the Federal Trade Commission in the Pittsburgh basing point case were concluded here today, and after a recess of ten days, hearings will be resumed at Birmingham. The Birmingham sessions are expected to last about a week, following which there will be another one-week interval whereupon the scene of the hearings will be transferred to New York. It is probable that witnesses from Pittsburgh will be called to New York and that no hearing will be held at Pittsburgh at all, or at the most for only a few days. Following the conclusion of testimony by New York and Pittsburgh witnesses, sessions will be held at Detroit, following which the Steel Corporation is expected to conclude the presentation of its evidence at Chicago. The hearings at Chicago during the week just past were devoted to the filing of trade reports compiled by Illinois Steel Co. salesmen and testimony by those salesmen as to how the reports were prepared.

¹"Acid and Basic Electric Steel," THE IRON AGE, June 10, 1922.

Improves Metal-Parts Washing Machine

The Colts Patent Fire Arms Mfg. Co., Hartford, has placed on the market an improved model of its Autosan metal-parts washing machine, which was described in THE IRON AGE of April 20, 1922. The machine is now manufactured on the unit principle and by joining units practically any desired length is available. Small work may be handled in baskets or larger work directly on the conveyor. The machines may be provided whatever number of top and bottom or side spray chambers is desirable for the work in hand. Ten sizes are regularly manufactured.

The arrangement of the various units may be noted from the accompanying illustrations, which show both sides and the end of the machine. The pumping unit is self-contained, a centrifugal pump, driving motor and independent control being provided, all being mounted on a cast iron base, which is supported by the structural members as shown. Rotor shafts run upon ball bearings. The conveyor is driven through a worm gear, sprockets and chain from a worm mounted on the rotor shaft nearest the operating end. The conveyor may be stopped without stopping the spray, as in the previous machine, and a safety stop is provided which automatically stops the conveyor in case a piece should fall partly through it. The conveyor is made up of



Small Work May Be Handled In Baskets and Large Work Directly on the Conveyor

separate links and is supported by a series of idle rollers throughout the length of the machine.

Spray arms are so mounted as to be easily accessible to facilitate cleaning, as in the previous design. The cleaning is accomplished by removing plugs at either end, and inserting a wire wound brush. Tanks of large capacity for holding the washing and rinsing solutions are provided, each tank having a steam coil for heating its contents. When the solution has been heated to the proper temperature the main steam valve is closed and a by-pass with small needle valve is opened, which admits sufficient steam to maintain the solution at the proper temperature.

Industrial Wages Double Pre-War

Figures of the National Industrial Conference Board, obtained on analysis of 23 manufacturing industries employing over 600,000 wage earners, show that average hourly earnings have increased from 23.9c. in July, 1914, to 50.9c. in February, 1923, a gain of 113 per cent. The present range is from 30.5c. for fertilizer manufacturing to 68.8c. for newspaper and periodical printing.

Because of slightly shorter hours, the average weekly earnings show a slightly smaller increase, being 105 per cent. The July, 1914, figure of \$12.30 had in-

creased to \$25.18 in February last. Fertilizer manufacturing again had the low position, with \$15.48 per week, while the \$32.50 of the iron and steel industry was the highest.

Comparing these changes with the cost of living, the report states that the real hourly earnings, based on purchasing power, are 35 per cent above the 1914 level, while the real weekly earnings are 30 per cent above that level.

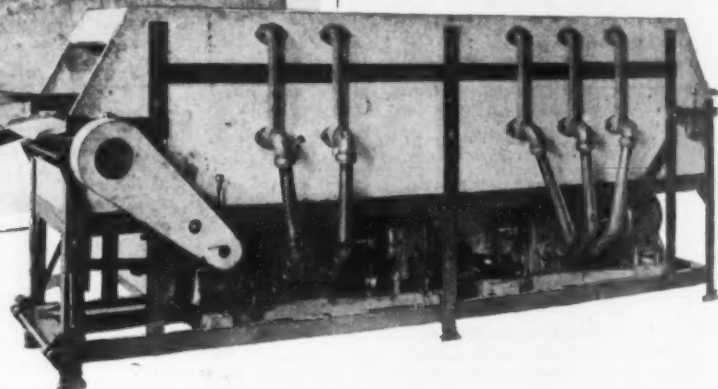
March Automobile Production Breaks Records

WASHINGTON, April 24.—Automobile production increased in March and was the highest on record, exceeding by 64,006 cars and trucks the high production of last June, according to reports received by the Department of Commerce through the Bureau of the Census, in cooperation with the National Automobile Chamber of Commerce. Output of passenger cars increased from 254,650 in February to 318,424 in March, and truck production increased from 21,815 in February to 34,593, a total of 353,019 in March.

Production for the first quarter of 1923 on the basis of figures now on hand shows 796,780 passenger cars and 75,785 trucks, a total of 872,565 vehicles.

The following table gives the total production for

Machine for Washing and Cleaning Metal Parts In Process. Operation is continuous. The machine is manufactured on the unit principle and by joining units machines of various lengths may be had



each of the last nine months, with the corresponding figures for the same months of the previous year. With few exceptions, the reports each month are from identical firms and include approximately 90 passenger-car and 80 truck manufacturers.

	Passenger Cars		Trucks	
	1922	1921	1922	1921
July	224,770	165,574	*21,837	10,766
August	*248,122	167,705	*24,467	13,080
September	*187,661	144,669	*19,188	13,648
October	216,099	134,734	21,512	12,813
November	*215,284	106,042	21,683	10,010
December	*207,269	70,690	20,050	8,307
January	223,706	81,693	*19,377	9,416
February	*254,650	109,171	*21,815	13,195
March	318,424	152,959	34,593	19,761

*Revised

The Gotfredson Truck Corporation, Ltd., of Canada, is now operating its American plant with headquarters at 3601 Gratiot Avenue, Detroit. Benjamin Gotfredson, president of the American Auto Trimming Co., Detroit, is president and general manager of the new company.

The Salem Iron Works, Salem, Ore., is being enlarged to practically twice its former capacity. The company recently installed a two-unit brass furnace and is contemplating the addition of another shortly.

Convention of Sheet Steel Executives

First of Its Kind—Administrative, Production and Distribution
Problems Each Given a Day—95 Per Cent of
Independent Capacity Represented

WHITE SULPHUR SPRINGS, W. VA., April 19.—The first annual convention of sheet steel executives was a success in the highest sense. Characterized by a policy of open and free discussion of vital problems affecting the sheet steel industry, the papers presented and discussion on them developed an interchange of ideas that were manifestly of great value. Coupled with it were social features participated in by the steel executives and their wives, which combined pleasure with business and brought out the personal and an enjoyable element, looking to better understanding.

The business program began on Tuesday and lasted over Thursday. The program of the first day dealt with administration. The papers and discussion on this topic brought out clearly the remarkable growth of the sheet steel industry and its bright prospects for the future. One of the high lights was the emphasis laid on the importance of improving human relations between employers and employees and the increasing responsibilities of executives toward labor. Great stress was laid on the importance of accurate statistical information and warm approval given to the report of the Hoover committee on the business cycle.

On the second day, given over to a discussion of production, the question of meeting the labor situation and increasing production without increasing costs was gone into at considerable length. While there were

both criticism and approval of the 3 per cent law which has had the effect of restricting the labor supply, it was the prevailing opinion that by increasing mechanical efficiency and the tonnage output per man, through such inducements as a bonus system and placing the pay of employees on a tonnage basis, together with a more intensive campaign of recruiting labor, the situation could be met. Attention was called to the fact that despite the restricted labor supply, production of sheet steel in the first quarter of the present year set a record in the history of industry. The vital problem of training men, including foremen and workers under them, formed an important part of the second day's program.

On the third day, which dealt with the question of distribution, the topics covered related to stimulating increased demand for sheet steel through avenues of new sources of consumption by an intensive national advertising campaign. The desirability of putting into effect standardized policies of selling and distributing also was emphasized. The necessity of executives' being acquainted with laws affecting sales made in interstate business also constituted an important part of the day's program. That great interest was taken in the convention was evident from the fact that those attending it represented 95 per cent of the independent sheet steel capacity.

Increasing Responsibility of Executive Toward Labor

IN opening the convention, Walter C. Carroll, vice-president Inland Steel Co., chairman of the general convention committee, spoke of its being the first of the kind ever held by the sheet manufacturers. He said that it grew out of suggestions for the need of the executives' getting together to study problems of the industry carefully and to improve social relations. The social features were enjoyed to the fullest, and many of the executives were accompanied by their wives.

Letters of regret at being unable to attend the convention from Chairman Charles M. Schwab of the Bethlehem Steel Corporation, President George M. Verity of the American Rolling Mill Co., and President George W. Niedringhaus of the National Enameling & Stamping Co., were read by Mr. Carroll, after which the chair was turned over to W. S. Horner, president of the National Association of Sheet and Tin Plate Manufacturers, and discussion of the first day's program regarding administration was begun.

Statistics of Sheet Steel

On "The Sheet Steel Industry," commenting on its relation to the steel industry, Mr. Horner remarked that "It is not difficult to identify the sheet steel industry, considering that in tonnage it comprises about 10 per cent of the finished steel capacity of the country." He put the 1922 production at 3,312,000 net tons, which is, according to THE IRON AGE's estimate in the issue of Jan. 4, 12 per cent of the total of 24,600,000 gross tons of rolled products but 12½ per cent of the total rolled steel, assuming 1,000,000 gross tons of rolled iron. This journal's estimate of the sheet production at the first of the year was roughly 11 per cent of the 24,600,000 gross tons, or 2,700,000 gross tons or 3,030,000 net tons.

The following statements of independent sheet mill

operations, production, sales and shipments for the first quarter of 1923 was submitted by Mr. Horner.

		Per Cent
Capacity	912,730 net tons	100.0
Per cent operating.....	88.8	
Production	826,600	90.6
Sales	906,600	99.4
Shipments	821,800	90.1
Rate of Operation	First half March.....	90.5
	Last half March.....	90.8
	Average for March.....	90.7

Growth During 1922

"It is interesting to note that during a year when the steel industry, and business in general, were recovering from an extreme depression, there was an increase in the number of mills of about 5 per cent," said Mr. Horner, commenting on the growth of the industry in 1922. "While at the first of the year there were 474 mills, exclusive of the American Sheet & Tin Plate Co., 25 additional ones were built during the year, so that on Jan. 1, 1923, there were 499 mills. During the first quarter of this year 10 mills were added. As of this date, therefore, there are 509 mills, exclusive of the Steel Corporation.

"Looking at the sheet steel industry as a whole, for the year 1922, the situation is as follows:

		Per Cent to Capacity
Total number of mills.....	659	
Average capacity for 1922....	4,560,770 net tons	
Per cent of operation.....		77.2
Total production	3,312,000	72.7
Total sales	3,800,500	83.6
Total shipments	3,300,000	72.5
Total unfilled tonnage, Jan. 1, 1923	987,265	260 (mo.)
Total unfilled tonnage, Jan. 1, 1922	439,000	110 (mo.)
Unfilled tonnage, April 1, 1923	1,190,000	
Per cent to monthly capacity		300.1

"The total number of mills as of this date, April,

1923, is 669, with an annual capacity of 4,745,500 tons.

Classification of Shipments

"It is likewise interesting to consider the classification of shipments in relation to consumption; in other words, where does the sheet steel go, and to what extent was it consumed in the various industries," said Mr. Horner. "During the last six months of 1922 a careful record was preserved of shipments, representing 25 companies, shipping 1,326,632 tons, or 88.6 per cent of total shipments of all independent manufacturers. The average for the six months, ended April 1, 1923, is given in the accompanying table:

Class	Per Cent
1. Automotive industry	34.5
2. Jobbers	14.4
3. Electrical manufacturers	8.2
4. Roofing	6.1
5. Barrel and keg manufacturers	4.9
6. Refrigerators—range boilers	4.0
7. Stove and range	3.4
8. Car builders	3.1
9. Metal furniture	2.7
10. Building construction	2.5
11. Export	2.2
12. Culvert and flume	2.0
13. Water trough and grain bins	1.9
14. Farm implements	1.2
15. Tack and nail plate .....	.2
16. Casket and vault manufacturers .....	.2
17. Miscellaneous	8.5
Total	100.0

"In all probability the tonnage against which these percentages are shown is sufficiently large to be representative, and, in large measure, typical of the industry as a whole. It would be better, of course, if it could be made complete, as related to total shipments. As the report is better understood and its value appreciated more manufacturers will in all probability contribute to it."

Discussing the need for industrial facts, Mr. Horner said:

"The Department of Commerce of our Government, under the most able direction of Herbert Hoover, a truly great man, has become a real and vital force in the commercial life of our nation. The entire country owes him a debt which it will be difficult to pay."

Commenting on liquidated damage, Mr. Horner said:

"While prices are now rising, they will become stationary in time, and later start to decline. Just when this will be no one can tell. Some think six months; others think prices will not decline for two or three years. Nevertheless, the time will surely come. During this period of business activity selling and contract policies should be carefully considered, and sound provision made for the period of decline, when it comes. Otherwise, diminishing demand will be accompanied by suspensions and cancellations, thus precipitating market collapse, as in the past, to the great detriment of all concerned. The recommendations of Mr. Hoover's committee, in this regard, should be carefully studied by business men generally."

Sounding the personal element, Mr. Horner declared:

"During the last depression—the most severe, in many respects, which our country has ever witnessed, and felt as keenly in the steel trade as anywhere else—the sheet steel branch of the industry did not descend to as low depths as other divisions, though losses were heavy, and the reaction was quicker and better sustained than in any other branch of the trade; this notwithstanding there are more individual manufacturers, and necessarily keener competition. For this we must give credit to men and not machines. May we not hope—nay, expect—that during any reverse market situation men will be equally sane?"

"... There is today, among sheet steel manufacturers, a noticeable modification of the skepticism of the earlier years of association. Confidence in each other is happily displacing suspicion, and fear is making way for trust. Surely no one will deny that this is a worthy and commendable situation, and one to which good men may well aspire."

Need and Respect for Company Policies

President William U. Follansbee of the Follansbee Brothers Co., Pittsburgh, speaking on "The Need and Respect for Company Policies," divided his subject

into two parts, the need for company policies and respect for company policies. He referred to the fact that at its origin the sheet trade was local and now is country-wide and international! The burdens on executives today were declared to be great. Among them were named state and national taxation and labor, once English, Scotch, Irish and Welsh, but today coming from many nations and speaking many tongues. The labor problem was said to involve the question of Americanization, requiring cooperation of employers throughout the country. In addition to the factor of foreign labor, Mr. Follansbee referred to migration of negroes to the industries of the North. The immigration laws were declared to be extremely important, and it was asked where labor is to be obtained if not from Hungary and other countries. He mildly criticized the delegates for not going to Washington en masse as a policy to show the necessity of more liberal immigration laws. The next policy necessary was declared to be educational.

The widespread advantage taken by children of mill workmen of American educational facilities was spoken of. It was stated, but not in a critical sense, that the children when grown up do not work in mills, but the fact does create a labor problem. The moral influence of the church, its growth, and prohibition was dwelt upon. He expressed gratification that the country will stay dry and said it was made so by employers, women and moral influences. Another need of company policy, it was said, pertains to the house shortage. He declared that it takes more houses today for the same number of people than before because foreign workers and their families have adopted American methods of living more comfortably and better dressed, the upshot of which is increased pride and self-respect. Mr. Follansbee referred to socialistic tendencies that also call for company policies to combat this trend.

Turning to "Respect for Company Policies," Mr. Follansbee said that they mean nothing unless they are given respect. He emphasized the importance of the human element in industry, the meaning of names and the reputation they carry. "Have we or have we not company policies that will be respected? Will they be respected by ourselves, our customers and the public?" Mr. Follansbee asked. "In these company policies let's get humanity in them. Let us set our standards high. Let us have company policies which we will respect ourselves and acquit ourselves like men."

Importance of Human Relations Emphasized

"Human Relations" was the subject of an address by President A. M. Oppenheimer of the Apollo Steel Co., Apollo, Pa., who warmly approved the remarks of Mr. Follansbee. Mr. Oppenheimer condemned as untrue the aphorism that "corporations have no souls." He pointed out the successful efforts of employers to build up a better understanding with employees, the introduction of profit sharing, group insurance, better housing, sanitation, pension funds, and other movements to show the strides made in the steel and other industries in connection with human relations. This constructive work was declared to be doing more than anything else to counteract socialism, revolutionary propaganda and other destructive forces being preached.

Achievements of steel leaders of the past and the present in establishing human relations with employees were mentioned and a detailed analysis of the human relations policy of the Pennsylvania Railroad for peacefully settling labor disputes was given and its accomplishments commented on favorably. The good influence on discipline of the worker in realizing that he is being consulted was pointed to as one of the benefits of establishing human relations. Personal notice and recognition given by executive, manager and foreman to workers was also declared to be entirely desirable. Mr. Oppenheimer completely discounted the possible objection that executives do not have time to show this respect to employees. He urged that industry adopt a policy of justice to all, of "live and let live."

President George Bartol of the Otis Steel Co., Cleveland, spoke briefly on "Executive Responsibilities," and stressed the need of executives centralizing in them-

selves responsibilities in handling relations with employees. He said that it is not possible for the executives to escape this duty.

On Threshold of Greatest Development

"General Forecast of Business," the subject of an address by President Severn P. Ker of the Sharon Steel Hoop Co., Sharon, Pa., was dealt with in an optimistic vein and with sound logic. To immediate users, he said, the greatest dangers are a runaway market and shortage of labor. But he said he did not think industry is going up to the "spiral." Never before, he declared, did he ever see business so conservative. This conservatism was claimed to be a dominant and a healthy sign. Admonition was given, however, that there is a threat of a buyers' strike in the building trades because of high prices and the demands of labor in the building trade. Agricultural interests in the Northwest also were said to be threatening a buyers' strike because of high prices of implements. Conditions in cotton growing states were declared to be healthy, though a recklessness of expenditures is shown in isolated cases.

Touching upon immigration, Mr. Ker said that he thought that the tendency of Congress, instead of being to lift restrictions now prevailing, is to increase them. He urged the necessity of more liberal immigration laws but at the same time suggested that only desirable immigration be permitted.

Mr. Ker said he does not believe that Congress has declared war on business, but that a few politicians are stirring up antagonism to business. It was stated that business must give more attention to public affairs if it wants to bring about modification of adverse legislation. He criticized the tendency to increase Government commissions, set up to supervise business.

Speaking of costs, it was said they may not be expected to decrease until mechanical efficiency is improved. Costs were said to be largely due to restrictive legislation controlling transportation and business. The management of railroads, it was said, has been taken over by the Government, and it cannot administer business capably. Mr. Ker said he felt sure that the Administration itself is making vigorous efforts to free business as much as possible, but that it cannot control Congress, which has enacted repressive legislation. The anti-business character of the next Congress was pointed to unfavorably. Mr. Ker said it is necessary to create public sentiment so as to modify the tendencies that are injurious to business.

"I believe we are just entering upon the greatest development of the iron and steel industry the world has ever seen," said Mr. Ker. He dwelt upon the depression growing out of the world war, the occupation of the Ruhr, unemployment and dominance of labor unionism in England and the enormous gold reserves in America, and the fact that this country produces half of the world's steel. He felt confident that bankers will work out world problems in some way and said that America will play a vital part in supplying the needs of the world. Mr. Ker predicted further great growth of the sheet industry, declaring that so far it has only scratched the surface. He referred to increased uses in steel barrels, metal furniture, drug containers, metal laths, window sills, automobiles and other sources of consumption.

"I think we have a right to look forward with confidence," said Mr. Ker. "We will have periods of depression and prosperity but the iron and steel industry has just begun its growth."

What May Be Done to Increase Production

THE program of the second day, given over to production, was in charge of Charles R. Hook, vice-president and general manager of the American Rolling Mill Co., Middletown, Ohio, and consisted of extremely interesting treatment of production problems from their various angles.

Clear recognition was given to the effect of restricted immigration on the labor supply for the sheet industry as well as industrially generally in the United States, and recommendations made to overcome the situation. A carefully prepared paper on "If Labor Is Not to Be Had Through Immigration, Then Where and How?" was presented on this study by C. L. Patterson, secretary of the Bureau of Labor, National Association of Sheet and Tin Plate Manufacturers. It was declared that a crisis has been reached where it is no longer possible to depend upon increasing the numerical forces of labor, and it is therefore necessary to increase the unit of production for each workman. To this end it was suggested that the industry should consider the further installation of labor-saving devices and the establishment of bonus systems and other inducements, including compensation on a tonnage basis.

Recruiting Agricultural Labor Suggested

Recruiting of agricultural labor also was urged through a campaign throughout the rural communities of the country with the use of moving pictures of the iron and steel industry from the ore to the finished processes, the explaining of advantages of advancement offered and the use of other means of bringing agricultural labor to the steel plants. Mr. Patterson explained that one year ago he would not have advocated the idea of taking labor from agriculture because of the importance of maintaining food production, but stated that since he had been told when he appeared before the House Committee on Immigration by its chairman that last year there was an excess of 33 1/3 per cent of food products produced he felt justified in urging this method of recruiting labor. He also suggested that industries set up employment offices at

ports of debarkation and industrial centers to persuade immigrants to go into steel mills.

Recruiting from Clerical Forces

Another means proposed was to recruit male labor from clerical and other forces whose work could be performed adequately by women. With these plans made effective, Mr. Patterson said, he felt that there is enough man power in the country without depending upon labor supplies through immigration.

"If every manufacturer in the country would throw out every able-bodied man in his plant whose work could be equally well done by a woman, and offer the man a job for which labor was scarce, we would have enough American-born men to fill every vacant job in the country," said Mr. Patterson.

Showing the effect of the 3 per cent immigration law in restricting the labor supply of this country, Mr. Patterson presented some interesting figures. He pointed out that in 1913 the net immigration was 815,303; in 1914, 769,276. From 1914 to 1920, inclusive, the total net immigration to this country was declared to be but 625,398. In 1921 the net immigration jumped to 552,132, but following the enactment of the 3 per cent restriction law, it fell to 87,121 in 1922. In other words, said Mr. Patterson, with 50 per cent more mills in the sheet steel industry than we had in 1914, and requiring at least 50 per cent more men to operate these mills, immigration in 1922 was but 11 per cent of these figures for 1914, and for the first time since the steel industry was started in this country "we are confronted with the problem of finding men or devising ways and means to man our mills."

In making suggestions to remedy the situation Mr. Patterson mentioned inducements the sheet steel industry has to offer labor. The points brought out in this connection included environment, residence and plant locality, to which was attributed ability to retain workmen.

"What inducements have we to offer a man to accept

(Continued on page 1229)

MANY BUSY PLANTS

Manufacturers Working to Capacity When Labor Can Be Obtained

Practically every industrial plant at Chambersburg, Pa., is running full, with the iron and metal-working establishments for the most part on an overtime schedule. The Chambersburg Engineering Co., affiliated with the Edward G. Budd Mfg. Co., Philadelphia, manufacturer of steel automobile bodies, is giving employment to a full force on long hours. The T. B. Woods Sons' Co., manufacturer of transmission equipment, is also on a heavy production basis and has been increasing its working quota.

The Colonial Steel Co., Colona, Pa., has adopted a maximum production schedule at its hammer department for the first time in the past 24 months. Close to 275 men are being employed. The plant is said to have orders to insure the present rate of output for an indefinite period.

Wabash, Ind., plants are advancing their production schedules and every mill is working. The Service Motors, Inc., recently organized to take over the plant and business of the Service Motor Truck Co., has added to its working force in recent weeks, and a maximum quota is now being employed. A night schedule has been adopted in certain departments. The company has heavy advance orders for motor trucks and railway motor coaches. The G. M. Diehl Machine Works is on a heavy production rating.

The American Zinc Products Co., Greencastle, Ind., specializing in the manufacture of boiler plates, corrugated roofing and siding, etc., has a two-shift day in operation at its local plant, with full working force at each turn. The company is said to have advance orders that insure full capacity for many weeks.

There is a steady call for machine tool operatives, molders and other skilled men in the metal-working trades at Newark, N. J., and the demand for tool makers, die-makers, and all-round machinists, usually fluctuating, is growing. The present wage basis for machinists in this section is 64c. per hour, as compared with 74c. during the peak of 1920; first class tool makers are receiving 75c. per hour, as against 88c. in 1920; first class metal polishers, 58c., as compared with 77c. in 1920; machinists' helpers are receiving 64c. per hour, and common labor, 41c. to 45c. A local metal-working shop, giving employment to about 200 men, is employing on an average of 35 new men a month to keep 20 vacancies filled, indicating that available labor is of the floating variety and practically impossible to retain.

The American Can Co. has resumed operations at its Eastport, Me., plant, and will gradually increase the working force until a full quota is reached. The factory is said to have secured orders for 750,000 cases of 100 cans each, and with the developing of maximum output early in May, will run full for several months.

Labor Shortage in Pennsylvania

HARRISBURG, PA., April 23.—Common labor wages in Pennsylvania in all lines of industry, including the iron and steel trade, show an increase of 100 per cent over this time last year, according to a report of the Pennsylvania Department of Labor and Industry. Increased wages are reported for common labor in all branches of work, following the recent increases in the steel industries.

While labor wages have been increased in virtually all iron and steel plants of the State, with some increases for other classes of workmen, mill officials seem unable to obtain sufficient help, and have labor scouts making intensive efforts to secure workmen.

Most mills are working at or near capacity. Erie reports its industries operating 92½ per cent capacity, with a steady demand for skilled machine operators. The demand for molders is somewhat lessened because of the scarcity of foundry laborers.

Harrisburg reports expansion in all branches of the trades, as well as in the concerns manufacturing machinery and parts.

The demand for both skilled and semi-skilled workmen in the McKeesport district is heavier than it has been for some time. The steel mills of the district are reported to have the largest unfilled tonnage they have had for some time.

Philadelphia reports that it is able to place readily all able-bodied men with six months' machine shop experience.

Pittsburgh reports that it has experienced no particular shortage of employees, although the demand for machinery workers continues good. Openings are available, however, in practically all phases of work common to this district.

Net Unfilled Sheet Orders Show Substantial Increase

Net obligations of the sheet steel manufacturers reporting to the National Association of Sheet and Tin Plate Manufacturers increased substantially in March, according to the monthly report of that organization. As of April 1, net obligations, arrived at by deducting unshipped and unsold stocks from unfilled orders, were 473,476 net tons against 399,537 tons on March 1, and 377,796 tons on Feb. 1.

With the figures for March, it is now possible to present the results of the first quarter of the year. Sales total 831,212 tons; productions 777,914 tons and shipments 753,348 tons. Sales for the period exceeded production by 53,298 tons and shipments by 77,864 tons. Net obligations as of April 1, assuming April production to be at the same rate as March, are equal to about 1.7 months' output.

The figures in net tons follow:

	March	February	January
Capacity	425,000	381,000	400,000
Capacity reporting.....	70.9%	70.1%	70.8%
Sales	325,526	253,197	252,489
Total production	279,475	237,919	260,520
Total shipments	237,203	217,808	248,337
Unfilled tonnage April 1.	619,823	547,897	511,346
Unshipped stocks	107,263	119,237	99,321
Unsold stock	29,084	29,123	32,229

Marked Increase in British Output

LONDON, ENGLAND, April 23. (By Cable)—A new high record in steel output since 1920 was registered in Great Britain in March, and the pig iron output was the largest since January, 1921. The March output of steel ingots and castings was 802,500 gross tons, which is in excess of the average rate per month in 1920 of 755,600 tons. The March pig iron production of 633,600 tons is the largest since January, 1921, when the output was 642,100 tons. The March figure compared with an output of 543,400 tons of pig iron and 707,100 of steel in February. The 1922 production averaged 408,300 tons of pig iron per month and 486,000 tons of steel ingots and castings per month.

The comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	639,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
1923, January	567,900	624,300
1923, February	543,400	707,100
1923, March	633,600	802,500

To Make Ingersoll-Rand Ammonia Compressors in Canada

The Canadian Ingersoll-Rand Co., Ltd., 260 St. James Street, Montreal, is placing on the Canadian market a line of straight line and duplex ammonia compressors for steam, belt, electric motor or oil engine drive. The machines correspond with those manufactured in this country by the Ingersoll-Rand Co., New York. The Canadian company is also builder of the Cameron steam and centrifugal pumps and other Ingersoll-Rand products.

The total horsepower of stokers sold in March, according to returns made to the Bureau of Census by 15 establishments was 68,955 hp. in March, against 66,619 in February and 83,270 in January.

Metal Trades Association Grows Steadily

Gratifying Progress Reported at Twenty-fifth Annual Convention
—Members Have Year Without Strikes—Immigration
and Other Subjects Considered

THE National Metal Trades Association, at its twenty-fifth annual convention at the Hotel Astor, New York, last week, heard interesting discussions of several current problems such as the American railroad situation, immigration, the legislative program of the American Federation of Labor, industrial courts and various other matters which vitally concern business.

During the past year the association has grown in membership, largely through the efforts of a membership committee which conducted an aggressive mail campaign among the 12,000 metal-working plants of the country which are eligible for membership. This campaign resulted in the taking on of 160 new members and the establishment of two new branches at Erie, Pa., and Utica, N. Y., according to the report of T. S. Hammond of the Whiting Corporation, Harvey, Ill., for the membership committee.

Another signal accomplishment of the association in the past year is the progress of industrial education among the plants of members. A largely increased number of companies is now providing systematic education for apprentices, specialists, operatives and foremen, and the committee on industrial education has actively cooperated in this work, particularly by the publication of a book entitled, "Elementary Machine Shop Practice," which will be sold to members at \$1 each for use in machine-shop instruction classes. Various training plans, such as the one employed in Boston with considerable success, were discussed.

Commissioner Sayre's Report

Commissioner Homer D. Sayre in his annual report called attention to the rapid progress which the association has made since it was organized 25 years ago. From a small group of 51 members at the first convention, the association has grown until today it has well over 1000 representative companies. Mr. Sayre added:

"I feel beyond any question of doubt that this steady growth on the part of our organization can be ascribed almost entirely to the fact that our association at the outset advocated principles which protect both the employer and employee, and at all times was in a position to defend its policies against outside interference.

"It is equally clear that even with our constructive

policy, we could not have made this progress without the able leadership of those members of our association who have given so liberally of their time and energy to this work, without compensation and sometimes at a great personal sacrifice, simply because of their honest belief in those principles for which we

stand, coupled with the knowledge that this work must be carried on and must rest upon the shoulders of those who are willing to assume the burden."

Referring to conditions in business, Mr. Sayre said that the improvement had been so marked that warnings are being sounded to avoid another period of inflation. He expressed the opinion that members of the association are moving cautiously to prevent inflation, and this is indicated by the fact that most of them have increased their working forces less than 50 per cent over the preceding year, while the improvement in business for a like period has in most instances been in excess of that percentage.

Mr. Sayre dwelt upon the great importance of constructive activities, especially industrial training. Compared with a year ago, the members' reports show an increase of 136 plants training apprentices, 272 training specialists or operators and 163 training foremen.

The year has been almost entirely free from labor difficulties. There were no strikes in plants of members of the association, but it rendered some assistance to three companies whose employees went on strike. In view of the size of the membership and the importance of the industry, the freedom from industrial trouble is regarded as remarkable.

Labor Shortage and Immigration

Magnus W. Alexander of the National Industrial Conference Board discussed the subject, "Shall We Close Our Gates to the Immigrant?"

Mr. Alexander said the opinions on this question ranged all the way from an emphatic "no" from those who consider only the economic aspect of the question to an equally emphatic "yes" from those who consider only the social side. Those who recognize it both as an economic and a social problem take a middle ground position, which Mr. Alexander seemed to take, saying that "in our desire to meet our economic needs, let us see that we do not create a social problem that in the next decade will impede the progress of our national life."



W. W. COLEMAN
RE-ELECTED PRESIDENT

OFFICERS ELECTED BY NATIONAL METAL TRADES ASSOCIATION

President—W. W. Coleman, Bucyrus Co., South Milwaukee, Wis. (Re-elected.)

First Vice-President—J. B. Doan, American Tool Works Co., Cincinnati. (Re-elected.)

Second Vice-President—Paul C. De Wolf, Brown & Sharpe Mfg. Co., Providence, R. I. (Re-elected.)

Treasurer—John W. O'Leary, Arthur J. O'Leary & Son Co., Chicago. (Re-elected.)

Councilors:

George P. Aborn, Worthington Pump & Machinery Corporation, East Cambridge, Mass.

Paul T. Norton, Case Crane & Engineering Co., Columbus, Ohio.

George L. Brunner, Brunner Mfg. Co., Utica, N. Y.

Harold C. Smith, Illinois Tool Works, Chicago.

A. F. Cooke, Fawcett Machine Co., Pittsburgh.

F. B. McBrier, Erie Steam Shovel Co., Erie, Pa.

Horace P. Dix, Wilmarth & Morman Co., Grand Rapids, Mich.

Justus H. Schwacke, William Sellers & Co., Philadelphia (honorary councilor).

After stating that the great progress which the United States has made industrially during the past half century has been accomplished with wide open immigration, Mr. Alexander did not argue that such wide-open immigration should continue, but he pointed out that whereas in previous decades a large proportion of our immigration came from the more assimilable races of Northern Europe, the tide of immigration in more recent years has been from the South of Europe, bringing a class of people not so readily taken into our national life.

Mr. Alexander recognized the labor problem of today as being due to several causes, among which he mentioned the falling off in the number of immigrants under the restrictive legislation now in effect; the enormous expansion of manufacturing facilities during the war period, and the lower rate of production per individual as compared to pre-war times. Only two out of every five persons in the United States are gainfully employed, Mr. Alexander said, the 60 per cent which is not gainfully employed being made up largely of women and children, the sick and feeble, the idle rich and loafers. Of the 106,000,000 people in the United States, as shown by the last census, 13,000,000 are engaged in manufacturing. The growth in our own population is not sufficient, he pointed out, to provide sufficiently for our own expansion. Another cause of labor shortage, the speaker said, is the dislocation of the labor supply. For example, he said that the 200,000 men who are not needed in the coal mining industry, there being a surplus of that number for the work of mining coal, would be very acceptable today in the steel industry and for many other occupations. If we had in this country some method of relocating our labor supply we would not be so dependent upon immigration. He analyzed the figures on immigration under the present restrictive act and said that countries in the South of Europe were quickly filling up their quotas while those of Northern Europe were not sending as many people as the law permits.

Mr. Alexander argued for a modification of the immigration laws which would protect our social development and at the same time provide us with more labor. His plan seemed to involve selective immigration to the extent that those most readily assimilable would be encouraged to come here.

Codification of Census Information

Mr. Alexander called attention to a book which the National Industrial Conference Board has just published which will be of great value to all business. It is a codification of all of the census information which has been gathered by the Bureau of Census of the United States since 1849, the statistical form of the census reports being avoided as much as possible and the information brought down into simple, relative form. The book is illustrated with 120 colored charts which show the progress of all industries during the period from 1849 up to and including the latest census figures. It will be sold at \$7.50 a copy and copies will be available May 1. The book will be brought up to date every two years by the addition of such further information as the Bureau of Census gathers.

The Kansas Industrial Court

Justice W. L. Huggins of the Kansas Supreme Court, delivered an able address on "The Old Government and the New Industry." Government, he declared, is the repository of power, and if it serves its intended purpose it cannot permit any other power to supplant it in the country. None will deny the right to quit work. But it is seldom that strikes stop with that. After speaking of the Debs railroad strike of 1894, which was ended by the action of President Cleveland, Judge Huggins expressed a desire that there might be an open-shop plank in the platform of one of the political parties at the next election; this, he thought, would show that Uncle Sam still rules and "that his last name is not Gompers." He continued his defense of the open-shop by showing how the strike, as we know it today, violates a clause in the Constitution, and further by calling to mind the close relation between communities makes it incumbent upon each to refrain from acts which will bring hardships upon the others. He quoted

the definition of a strike announced by Justice Brewer: "Private individuals seeking to exercise power which belongs only to government."

Judge Huggins then proceeded to defend the Kansas Court of Industrial Relations described in his address of which an abstract was published in THE IRON AGE of March 1, 1923. The Kansas Court prohibits picketing and intimidation. If a job is left, it is at once open to another. Labor is not allowed to cripple an industry. Property rights are protected by the clause which provides that the worker shall get a fair wage and capital invested shall at all times receive a fair return. It further provides for a review of the facts in any decision not agreeable to either party, this review to be made by the Supreme Court. In concluding, the speaker warned against a thoroughly organized force of communism, and declared that "any group which may be bid for as a bloc is a menace."

Business Men in Politics

Senator Arthur R. Baxter, Indianapolis, followed with an address on "Business Men in Politics," in which he urged more active participation in the affairs of government. Insofar as law represents an over-drawn share of the views of one group and a diminished share of the views of another it is not representative, he said. Men of manufacturers' views can protect business, but at present there is a deplorable dearth of these men in both State and National bodies.

Mr. Baxter speaks as a manufacturer of long experience and as a legislator with two terms behind him. He knows great forces are arrayed against the business man, and likewise knows the reluctance to quit business for the lottery of politics. "But," he urged, "if you do not quickly take active part in politics, you will soon have no business to run."

English manufacturers, he said, were too engrossed in business to lend a hand in directing legislative courses and today they find themselves so hopelessly engrossed in difficulties that business goes begging. It is not sufficient to belong to an association and have a lobbyist. The speaker believes the election of a man like La Follette could upset the country over night.

There are large tasks for business men in politics—to check on appropriations, to prepare budgets, to prevent pernicious bills and to crystallize loose views, which often lead astray or get nowhere. Senator Baxter warned of attacks made upon business men who go into public life, but the benefits derived and standards set, he believes, easily offset that bad feature. He decried the disposition merely to suggest and recommend, and urged that everyone take some active political interest to safeguard American business.

Law of Supply and Demand

Dr. G. W. Dyer, professor of social science, Vanderbilt University, spoke on "The Law of Supply and Demand." Much of our trouble he ascribes to failure in recognizing the unrelenting law of supply and demand, by which the wages of labor, skilled and unskilled, and the manager's salary alike are fixed. Water and air cost nothing, for the supply of each is limitless. So skilled labor, being more scarce, is more highly paid than common labor; and managers and executives, being immeasurably more scarce than either, are paid still more. Every service and commodity is valued by the same law.

It is often easy to be fooled by this law. It is known that one mill pays \$2 per day, another \$2.50, still another \$3. But there is difference in the quality of labor, and in the end cheap labor is the most expensive.

Another fallacy is that labor alone creates. This is the bottom doctrine of Bolshevism, which has but one merit—it proves to the rest of the world that the Russian experiment will not work. Given capital, labor and materials, each alone is worthless, but the brains which turn them into commodities produce. There can be no fusion of the American doctrine of valuation and the Bolshevistic "living wage."

Business Conditions Sound

Dr. J. T. Holdsworth, vice-president Bank of Pittsburgh, speaking on "Business Expansion," made a gen-

eral resumé of conditions in basic industries. Prosperity is here, he believes, and all points to its continuance. "It is real," he said. "No signs appear of abnormal expansion or over speculation." He expressed the opinion that the talk on labor shortage is much overdrawn. While there is a shortage in some sections, others are amply supplied. The farmer is the last one to realize on the prosperity and it will come to him with good markets.

Despite Europe's turmoil, and the restrictive tariff, trade goes ahead at a good pace. The banking situation, he believes, is sound. The reserve ratio has been above 75 per cent and the inflow of gold is steady. Dr. Holdsworth has no misgivings as to the credit situation. "It must be noted," however, he warns, "that the stage is set for inflation."

Business appears to him to be pretty well stabilized. "Expansion," he said, "is not to be confused with inflation. With sound steps this prosperity may be continued indefinitely." The remainder of his discourse was given to indorsing the opinion of previous speakers that the business man ought to act more as a constructive factor in legislation than as a mere commentator.

Labor's Legislative Program

The legislative program of the American Federation of Labor was interestingly and instructively discussed by Walter Gordon Merritt, counsel of the League for Industrial Rights, who said that a fight which has been waged for a quarter of a century for the right of the individual to labor when and where he pleases has been essentially won through recent decisions of the United States Supreme Court. As a result of these decisions, Mr. Merritt said, employers and labor are entering upon a new era of industrial relations wherein no economic combination of either capital or labor shall be considered lawful when there is any implied purpose to carry on a program inimical to the interests of society as a whole.

Mr. Merritt pointed out several of the Supreme Court decisions which are of greatest moment in the labor situation. One is the upholding of anti-picketing laws, the upholding of anti-injunction laws, the decision that arbitration agreements entered into between employers and employees are enforceable by law and other decisions, all of which have fixed upon organized labor a new responsibility in industrial disputes.

The American Federation of Labor, Mr. Merritt said, is fighting to obtain the passage of laws which will practically nullify the decisions of the United States Supreme Court. The federation, he said, is fighting against the right of society to protect itself against privation or other consequences of labor disturbances.

Labor Problems of the Farmer

The farmer cannot compete in the labor market of today, said Sherman J. Lowell, master of the National Grange, a farmers' organization. Mr. Lowell said it is becoming more and more difficult to turn the young man toward the farm and the use of labor-saving machinery must of necessity be employed to a growing extent to maintain the crop production that is needed. Mr. Sherman discussed the politics of the farmer and said that he did not believe any movement to ally the farmer with labor would succeed. The farmer, he said, is not destructive by nature and he could never use his tremendous power over the food supply in a destructive way to gain his own ends. He drew a picture of the sad plight which many farmers find themselves in today because of mortgages and heavy taxes which they are virtually unable to pay in many cases.

The Railroad Problem Discussed

Robert S. Binkerd, vice-chairman of the committee on public relations of the Eastern railroads, made a plea for fair treatment for the railroads. He said that the real railroad problem today is whether the people of the United States will support transportation policies which are in their own interest. Mr. Binkerd pointed out that the railroads are straining every nerve to put their roads and rolling stock back in good condition. He said that a billion dollars a year in operating costs has been saved and that half of this amount

has been given back to the people in form of reduced freight rates. He said that the returns to owners of stock had come up from practically zero to \$777,000,000 and may come up to a billion dollars in 1923, which will be a scant 5 per cent return on the aggregate value, placed at twenty billions of dollars.

Mr. Binkerd said that the relationship of freight rates to commodity values in 1921 was undoubtedly hurtful, and he said further that a blanket reduction in rates leaves certain inconsistencies, but that these are being ironed out as rapidly as possible. He urged that the difficulties of the railroads could better be worked out by the roads in their own way and hoped that this orderly process would be permitted rather than to bring on possible chaos again by resorting to further political regulation.

He told of the large investment of the railroads in rolling stock, of their effort to help out the coal situation by storing their coal for winter use prior to Sept. 1 and by the completion of their maintenance work by the same date.

Convention Resolutions

The convention passed a number of resolutions, one of which contributed \$5,000 to the work of the National Industrial Conference Board; another donated \$5,000 to the work of the publicity committee, while a third commended the report of the committee on industrial education and urged that all members of the association establish some form of systematic training work in their own plants.

The election of officers completed the program.

The Banquet

Managers of the banquets held at association conventions have learned that to have but one speaker, and that speaker a star, makes a hit with the average member. This was the way at the Wednesday night dinner at the Astor. Some good advertising had been done, also, and expectations were whetted by the announcement that the speaker, Laurance Lyon, British publicist, is now known to have been the author of "The Pomp of Power," a book published anonymously in England last year that caused no little stir by giving so many inside facts of the post-war diplomacy of Europe.

Mr. Lyon was a member of the British Parliament until 1921 and in the war years was proprietor of the *Outlook*, a British weekly that commented frankly on the Government's war policy. His address of Wednesday night was a full hour long and was interesting every minute. He thought it likely that a labor government might come into power in Great Britain in the next five years, but believed that such an administration was not to be feared, since it could only be seated on such a modification of the labor party's platform as would gain it the support of the great middle class of British citizenry. The speaker discussed the League of Nations, the weaknesses of the treaty of Versailles and the present situation in the Ruhr. He did not attempt to say what the United States should do, but admitted that it need not be expected that any government would adopt a policy except it was in its interest to do so. Eventually he believed this country would find it to its interest to have some part in determining the situation in Europe.

Mr. Lyon is not unsympathetic with the French aims in connection with the Ruhr seizure. He believes France has no desire to acquire an inch of German territory, and considers that her two-fold demand—for reparations and security for the future—furnish altogether the motive of her policy in respect to Germany.

Cost of living figures for March 15 compiled by the National Industrial Conference Board show a slight increase over February. The cost is now placed at 59.2 per cent above that of July, 1914, compared with 57.5 per cent in February, 58.4 per cent last November and a peak of 104.5 per cent in July, 1920. Increases during the month were recorded in rent, clothing and sundries and a slight decrease in fuel and light. Food remains stationary.

After stating that the great progress which the United States has made industrially during the past half century has been accomplished with wide open immigration, Mr. Alexander did not argue that such wide-open immigration should continue, but he pointed out that whereas in previous decades a large proportion of our immigration came from the more assimilable races of Northern Europe, the tide of immigration in more recent years has been from the South of Europe, bringing a class of people not so readily taken into our national life.

Mr. Alexander recognized the labor problem of today as being due to several causes, among which he mentioned the falling off in the number of immigrants under the restrictive legislation now in effect; the enormous expansion of manufacturing facilities during the war period, and the lower rate of production per individual as compared to pre-war times. Only two out of every five persons in the United States are gainfully employed, Mr. Alexander said, the 60 per cent which is not gainfully employed being made up largely of women and children, the sick and feeble, the idle rich and loafers. Of the 106,000,000 people in the United States, as shown by the last census, 13,000,000 are engaged in manufacturing. The growth in our own population is not sufficient, he pointed out, to provide sufficiently for our own expansion. Another cause of labor shortage, the speaker said, is the dislocation of the labor supply. For example, he said that the 200,000 men who are not needed in the coal mining industry, there being a surplus of that number for the work of mining coal, would be very acceptable today in the steel industry and for many other occupations. If we had in this country some method of relocating our labor supply we would not be so dependent upon immigration. He analyzed the figures on immigration under the present restrictive act and said that countries in the South of Europe were quickly filling up their quotas while those of Northern Europe were not sending as many people as the law permits.

Mr. Alexander argued for a modification of the immigration laws which would protect our social development and at the same time provide us with more labor. His plan seemed to involve selective immigration to the extent that those most readily assimilable would be encouraged to come here.

Codification of Census Information

Mr. Alexander called attention to a book which the National Industrial Conference Board has just published which will be of great value to all business. It is a codification of all of the census information which has been gathered by the Bureau of Census of the United States since 1849, the statistical form of the census reports being avoided as much as possible and the information brought down into simple, relative form. The book is illustrated with 120 colored charts which show the progress of all industries during the period from 1849 up to and including the latest census figures. It will be sold at \$7.50 a copy and copies will be available May 1. The book will be brought up to date every two years by the addition of such further information as the Bureau of Census gathers.

The Kansas Industrial Court

Justice W. L. Huggins of the Kansas Supreme Court, delivered an able address on "The Old Government and the New Industry." Government, he declared, is the repository of power, and if it serves its intended purpose it cannot permit any other power to supplant it in the country. None will deny the right to quit work. But it is seldom that strikes stop with that. After speaking of the Debs railroad strike of 1894, which was ended by the action of President Cleveland, Judge Huggins expressed a desire that there might be an open-shop plank in the platform of one of the political parties at the next election; this, he thought, would show that Uncle Sam still rules and "that his last name is not Gompers." He continued his defense of the open-shop by showing how the strike, as we know it today, violates a clause in the Constitution, and further by calling to mind the close relation between communities makes it incumbent upon each to refrain from acts which will bring hardships upon the others. He quoted

the definition of a strike announced by Justice Brewer: "Private individuals seeking to exercise power which belongs only to government."

Judge Huggins then proceeded to defend the Kansas Court of Industrial Relations described in his address of which an abstract was published in THE IRON AGE of March 1, 1923. The Kansas Court prohibits picketing and intimidation. If a job is left, it is at once open to another. Labor is not allowed to cripple an industry. Property rights are protected by the clause which provides that the worker shall get a fair wage and capital invested shall at all times receive a fair return. It further provides for a review of the facts in any decision not agreeable to either party, this review to be made by the Supreme Court. In concluding, the speaker warned against a thoroughly organized force of communism, and declared that "any group which may be bid for as a bloc is a menace."

Business Men in Politics

Senator Arthur R. Baxter, Indianapolis, followed with an address on "Business Men in Politics," in which he urged more active participation in the affairs of government. Insofar as law represents an over-drawn share of the views of one group and a diminished share of the views of another it is not representative, he said. Men of manufacturers' views can protect business, but at present there is a deplorable dearth of these men in both State and National bodies.

Mr. Baxter speaks as a manufacturer of long experience and as a legislator with two terms behind him. He knows great forces are arrayed against the business man, and likewise knows the reluctance to quit business for the lottery of politics. "But," he urged, "if you do not quickly take active part in politics, you will soon have no business to run."

English manufacturers, he said, were too engrossed in business to lend a hand in directing legislative courses and today they find themselves so hopelessly engrossed in difficulties that business goes begging. It is not sufficient to belong to an association and have a lobbyist. The speaker believes the election of a man like La Follette could upset the country over night.

There are large tasks for business men in politics—to check on appropriations, to prepare budgets, to prevent pernicious bills and to crystallize loose views, which often lead astray or get nowhere. Senator Baxter warned of attacks made upon business men who go into public life, but the benefits derived and standards set, he believes, easily offset that bad feature. He decried the disposition merely to suggest and recommend, and urged that everyone take some active political interest to safeguard American business.

Law of Supply and Demand

Dr. G. W. Dyer, professor of social science, Vanderbilt University, spoke on "The Law of Supply and Demand." Much of our trouble he ascribes to failure in recognizing the unrelenting law of supply and demand, by which the wages of labor, skilled and unskilled, and the manager's salary alike are fixed. Water and air cost nothing, for the supply of each is limitless. So skilled labor, being more scarce, is more highly paid than common labor; and managers and executives, being immeasurably more scarce than either, are paid still more. Every service and commodity is valued by the same law.

It is often easy to be fooled by this law. It is known that one mill pays \$2 per day, another \$2.50, still another \$3. But there is difference in the quality of labor, and in the end cheap labor is the most expensive.

Another fallacy is that labor alone creates. This is the bottom doctrine of Bolshevism, which has but one merit—it proves to the rest of the world that the Russian experiment will not work. Given capital, labor and materials, each alone is worthless, but the brains which turn them into commodities produce. There can be no fusion of the American doctrine of valuation and the Bolshevistic "living wage."

Business Conditions Sound

Dr. J. T. Holdsworth, vice-president Bank of Pittsburgh, speaking on "Business Expansion," made a gen-

eral résumé of conditions in basic industries. Prosperity is here, he believes, and all points to its continuance. "It is real," he said. "No signs appear of abnormal expansion or over speculation." He expressed the opinion that the talk on labor shortage is much overdrawn. While there is a shortage in some sections, others are amply supplied. The farmer is the last one to realize on the prosperity and it will come to him with good markets.

Despite Europe's turmoil, and the restrictive tariff, trade goes ahead at a good pace. The banking situation, he believes, is sound. The reserve ratio has been above 75 per cent and the inflow of gold is steady. Dr. Holdsworth has no misgivings as to the credit situation. "It must be noted," however, he warns, "that the stage is set for inflation."

Business appears to him to be pretty well stabilized. "Expansion," he said, "is not to be confused with inflation. With sound steps this prosperity may be continued indefinitely." The remainder of his discourse was given to indorsing the opinion of previous speakers that the business man ought to act more as a constructive factor in legislation than as a mere commentator.

Labor's Legislative Program

The legislative program of the American Federation of Labor was interestingly and instructively discussed by Walter Gordon Merritt, counsel of the League for Industrial Rights, who said that a fight which has been waged for a quarter of a century for the right of the individual to labor when and where he pleases has been essentially won through recent decisions of the United States Supreme Court. As a result of these decisions, Mr. Merritt said, employers and labor are entering upon a new era of industrial relations wherein no economic combination of either capital or labor shall be considered lawful when there is any implied purpose to carry on a program inimical to the interests of society as a whole.

Mr. Merritt pointed out several of the Supreme Court decisions which are of greatest moment in the labor situation. One is the upholding of anti-picketing laws, the upholding of anti-injunction laws, the decision that arbitration agreements entered into between employers and employees are enforceable by law and other decisions, all of which have fixed upon organized labor a new responsibility in industrial disputes.

The American Federation of Labor, Mr. Merritt said, is fighting to obtain the passage of laws which will practically nullify the decisions of the United States Supreme Court. The federation, he said, is fighting against the right of society to protect itself against privation or other consequences of labor disturbances.

Labor Problems of the Farmer

The farmer cannot compete in the labor market of today, said Sherman J. Lowell, master of the National Grange, a farmers' organization. Mr. Lowell said it is becoming more and more difficult to turn the young man toward the farm and the use of labor-saving machinery must of necessity be employed to a growing extent to maintain the crop production that is needed. Mr. Sherman discussed the politics of the farmer and said that he did not believe any movement to ally the farmer with labor would succeed. The farmer, he said, is not destructive by nature and he could never use his tremendous power over the food supply in a destructive way to gain his own ends. He drew a picture of the sad plight which many farmers find themselves in today because of mortgages and heavy taxes which they are virtually unable to pay in many cases.

The Railroad Problem Discussed

Robert S. Binkerd, vice-chairman of the committee on public relations of the Eastern railroads, made a plea for fair treatment for the railroads. He said that the real railroad problem today is whether the people of the United States will support transportation policies which are in their own interest. Mr. Binkerd pointed out that the railroads are straining every nerve to put their roads and rolling stock back in good condition. He said that a billion dollars a year in operating costs has been saved and that half of this amount

has been given back to the people in form of reduced freight rates. He said that the returns to owners of stock had come up from practically zero to \$777,000,000 and may come up to a billion dollars in 1923, which will be a scant 5 per cent return on the aggregate value, placed at twenty billions of dollars.

Mr. Binkerd said that the relationship of freight rates to commodity values in 1921 was undoubtedly hurtful, and he said further that a blanket reduction in rates leaves certain inconsistencies, but that these are being ironed out as rapidly as possible. He urged that the difficulties of the railroads could better be worked out by the roads in their own way and hoped that this orderly process would be permitted rather than to bring on possible chaos again by resorting to further political regulation.

He told of the large investment of the railroads in rolling stock, of their effort to help out the coal situation by storing their coal for winter use prior to Sept. 1 and by the completion of their maintenance work by the same date.

Convention Resolutions

The convention passed a number of resolutions, one of which contributed \$5,000 to the work of the National Industrial Conference Board; another donated \$5,000 to the work of the publicity committee, while a third commended the report of the committee on industrial education and urged that all members of the association establish some form of systematic training work in their own plants.

The election of officers completed the program.

The Banquet

Managers of the banquets held at association conventions have learned that to have but one speaker, and that speaker a star, makes a hit with the average member. This was the way at the Wednesday night dinner at the Astor. Some good advertising had been done, also, and expectations were whetted by the announcement that the speaker, Laurance Lyon, British publicist, is now known to have been the author of "The Pomp of Power," a book published anonymously in England last year that caused no little stir by giving so many inside facts of the post-war diplomacy of Europe.

Mr. Lyon was a member of the British Parliament until 1921 and in the war years was proprietor of the *Outlook*, a British weekly that commented frankly on the Government's war policy. His address of Wednesday night was a full hour long and was interesting every minute. He thought it likely that a labor government might come into power in Great Britain in the next five years, but believed that such an administration was not to be feared, since it could only be seated on such a modification of the labor party's platform as would gain it the support of the great middle class of British citizenry. The speaker discussed the League of Nations, the weaknesses of the treaty of Versailles and the present situation in the Ruhr. He did not attempt to say what the United States should do, but admitted that it need not be expected that any government would adopt a policy except it was in its interest to do so. Eventually he believed this country would find it to its interest to have some part in determining the situation in Europe.

Mr. Lyon is not unsympathetic with the French aims in connection with the Ruhr seizure. He believes France has no desire to acquire an inch of German territory, and considers that her two-fold demand—for reparations and security for the future—furnish altogether the motive of her policy in respect to Germany.

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FOUNDRY ACCESSORIES

Vibrator for Shaking Out Castings—Detachable Swivel Air Connection Prevents Kinking of Hose

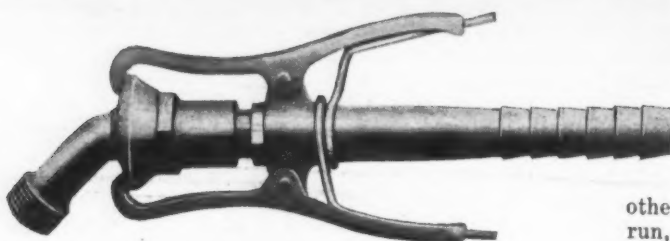
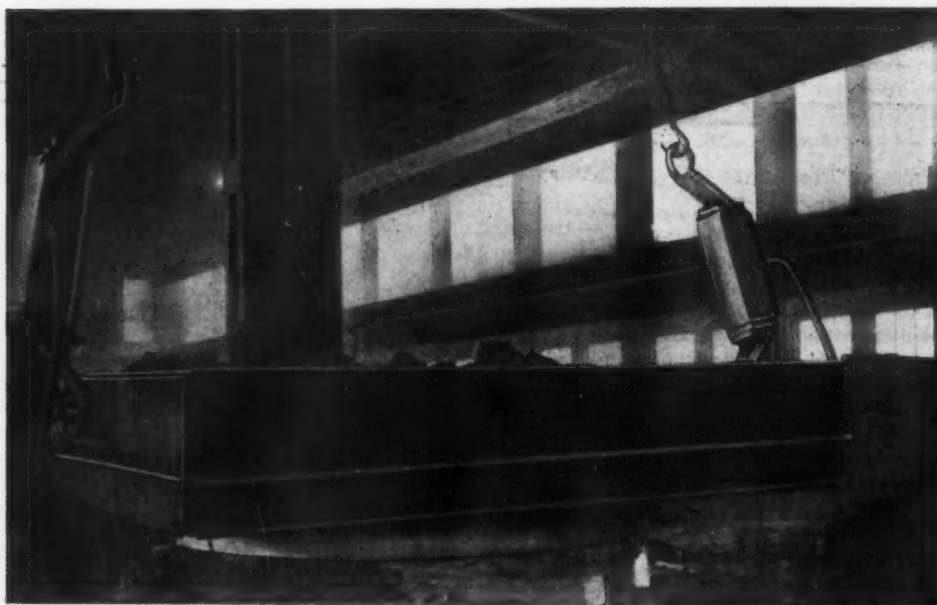
To facilitate the shaking out of large castings the Malleable Iron Fittings Co., Bradford, Conn., has developed a larger line of vibrators than those it has been manufacturing for its vibrator tables. The vibrators are used in conjunction with a chain sling suspended from the crane hook, one being attached to each hook of the sling.

The vibrator for this new use is made in different sizes, those shown having pistons 5 in. in diameter and weighing 65 lb. The picture shows the shaking

ily be understood that the vibrators can be employed with flasks of any size or shape without any adjustments whatever. The time required for shaking out the flask shown was 3½ min. The steel casting can be seen emerging below the bottom of the flask just before it dropped.

Self-Grinding Air Connection

To avoid the troublesome kinking of air hose, with its consequent damage to the hose, this company has developed a quick detachable swivel air connection. This connection will swivel easily under 100 lb. air pressure. Attachment or detachment is accomplished by pressure on the grip levers. This quick acting feature is of value as it permits the hose to be instantly detached, so that the vibrator, hammer, air motor or



Shaking Out Large Castings from Flasks by Means of Vibrators Carried in Chains from the Supporting Crane Hook. At left is a quickly detachable swiveling air hose connection



out of a mold 8 x 6 ft. and 20 in. deep. The eye at the lower end of the vibrator bracket is engaged on a tapered trunnion on the flask with a key to hold it in place. This form of trunnion is employed to "deliver 100 per cent of the vibration" to the flask. It can read-

other tool being used, may be oiled after each day's run, or during the day when necessary.

One feature emphasized is that the connection is practically self grinding. The points on the grip levers slide on a taper on the female connection, which is the elbow, and as the swivel operates a gradual grinding in operation is accomplished, thereby calculated to keep the joint tight. This connection can also be used with steam and water lines.

Increases in Base Rates Proposed by Amalgamated Association

YOUNGSTOWN, April 24.—Increases in the base rates now being paid have been recommended by the wage committee of the Amalgamated Association of Iron, Steel and Tin Workers, which last week concluded its forty-eighth annual convention at Warren, Ohio, following two weeks' conference. The program adopted by the convention will be submitted to employers who operate their plants under the sliding wage scale of the Amalgamated association.

The annual wage conference between the employers and workers will be held beginning May 15 at Atlantic City. Current agreements expire June 30. In the bar iron division, employers will act through the Western Bar Iron Association, while sheet and tin plate makers will act through the Western Sheet & Tin Plate Manufacturers' Association.

The Amalgamated association asks increases in the

tonnage base rates ranging from 10 to 20 per cent. It proposes that the boiling scale base rate be fixed at \$7.50 per ton, as compared with the present base of \$6.

Other suggestions adopted by the Amalgamated association, to be presented to employers are:

That Thanksgiving be given as a mill workers' holiday to be observed in all departments.

That bushelling on sand bottom scale be advanced 10 per cent added to the base rate of the present scale. That two men and a fireman be on each furnace and that the company pay for all blooms and sliders. Muck or puddle mill scale, 10 per cent advance on base price, roller and rolled hand scale.

That 17½c. per ton extra be paid on 2-in. billets and smaller.

A Dorr thickener and equipment for sludge disposal are to be installed at the National works of the National Tube Co. by Freyn, Brassert & Co., Chicago.

Gear Problems Discussed at Cleveland

Annual Meeting Registered Further Advances in Gear Standardization and Contributed to Technical Literature on Subject

—F. W. Sinram, Honorary President

CONSIDERABLE progress in the work of gear standardization was made at the annual meeting of the American Gear Manufacturers' Association held in Cleveland last week. The most important definite accomplishment was the submission and adoption as recommended practice for future design of the remainder of the Gleason Works bevel gear system presented at the Chicago meeting in October and already printed. Reports of the standardization committees and discussions occupied the greater part of the time of the three days of meeting and several interesting technical papers were presented.

The committee reports indicated that a great deal of study had been given to the various topics and the reports as well as the discussions showed the earnest efforts of the members of the association and their spirit of cooperation in working out the various standards. The subject that led to the most lengthy discussion was cost accounting, which appears to be one of the knotty problems of the association; but the members are hopeful of succeeding in standardizing on a uniform cost accounting system. One of the interesting reports was that of the metallurgical committee which will have something definite to offer at the next meeting in the way of recommended practice for steel castings.

F. W. Sinram Elected Honorary President

The meeting was the seventh annual meeting and was held in the Hotel Cleveland, April 19, 20 and 21, with a registration of 99 members. This meeting marked the retirement as president of F. W. Sinram, Van Dorn & Dutton Co., Cleveland, who has officiated as head of the organization since its inception. In his place George L. Markland, Jr., Philadelphia, was elected president. Mr. Sinram had previously attempted to have the duties of the presidency shifted to another's shoulders but had acceded to the solicitations of the members and accepted re-election. In recognition of Mr. Sinram's long and valued services as chief executive of the association the membership unanimously elected him honorary president for life.

The chairman announced that the next meeting will be held at Lake Mohonk, N. Y., the date to be announced later. Arrangements have been made for a meeting of the technical standardization committees at the Clifton Hotel, Niagara Falls, Ont., June 8 and 9, the committee chairmen to meet the first day and the members the following day.

Two executive group meetings, one of the automobile and the other of the industrial gear makers, were scheduled but owing to lack of time only the former was held. The discussion at this meeting was confined largely to the situation of the automobile gear industry brought about by the seasonal activities of the motor car builders. It was pointed out that an important problem the automobile gear makers have to solve is to devise a way to flatten out the curve in production, eliminate the humps and valleys and effect a steady production. It was declared that few car builders appreciate the difficulties of the gear makers and that the former should be educated to understand the problems of the latter, so that they would not expect prompt deliveries on largely increased orders. It was estimated that according to the prevailing system of

buying gears the business of the automotive gear maker is 75 per cent larger from March to July than during the remaining eight months of the year. It was stated that the General Motors Corporation being both a maker of parts and of cars appreciates the troubles of the parts makers and gives specifications five months in advance with some monthly modifications in its orders.

In the place of his annual report, President F. W. Sinram sent a pre-convention message to the members reviewing the history, objects and accomplishments of the organization and declaring that conditions are now more favorable to the natural progress of the association and fulfilment of its aims than at any previous time since its organization. He declared one of the greatest accomplishments had been the ever increasing spirit of cooperation created in the industry and he emphasized

that the improvements in production had been material. "This has been in step with the tendency of the times," The increased application of gears, he added, should receive serious consideration from time to time. Among other things he suggested a discussion of the various phases of the labor problem at the association meetings.

"Times and conditions now being more favorable for progress in standardization than ever before in our history," said Mr. Sinram, "it devolves upon us to take up this phase of our activities with renewed vigor—and the work is one in which every technical and practical man in the industry should desire a part. As a unit of the industry you should be most anxious to contribute—this is an obligation you owe your trade, yourself, and the mechanical world."



GEO. L. MARKLAND, JR.
President American Gear
Manufacturers' Association

New Officers

The nominating committee, through A. A. Gloetzner, its chairman, announced that it had decided to divide the nominations for five members of the executive committee between the industrial gear and automobile gear manufacturers. The following five members were elected: B. F. Waterman, Brown & Sharpe Mfg. Co., George L. Markland, Jr., Philadelphia Gear Works, A. W. Copland, Detroit Gear & Machine Co., R. P. Johnson, Warner Gear Co., Muncie, Ind., C. B. Hamilton, Hamilton Gear & Machine Co., Toronto, Canada. The directors were elected for a period of three years with the exception of Mr. Hamilton who was elected for a two year period to fill the remainder of the term of the late John B. Foote. Later Arthur E. Parsons, Brown-Lipe Gear Co., Syracuse, N. Y., was named as a member of the committee to fill the unexpired term of Frank D. Hamlin, Philadelphia.

Later at a meeting of the executive committee the following officials were elected: George L. Markland, Jr., president; A. W. Copland, first vice-president; B. F. Waterman, second vice-president, and C. F. Goedke, William Ganchow Co., Chicago, treasurer.

The following new members were elected: L. M. Thomas, Timken Detroit Axle Co.; Jacob Braun, Braun Gear Corporation, Brooklyn; James C. Hope, Covert Gear Co., Inc., LaPorte, Ind.; J. K. Rewalt, Philadelphia Gear Works, and J. W. Davis, Diamond State Gear Co. The membership of W. H. Lyman, formerly with Warner Gear Co., was transferred to the Automotive Gear Works, at Richmond, Ind., where he now is.

Five general sessions were held including one evening session. During each session a number of committee reports on standardization were presented and discussed. The following papers were presented: "What Does the Microscope Tell Us?" by E. C. Smith, chief metallurgist, Central Steel Co., Massillon, Ohio; "Grinding and Measuring Involute Gear Teeth," by E. J. Lees, Lees-Bradner Co., Cleveland; "Gear Testing Machine," by Wilfred Lewis, Tabor Mfg. Co., Philadelphia; "Tooth Forms of Automobile Gears After Cutting, Hardening and Grinding," by L. K. Hermann, Studebaker Corporation; "Some Thoughts of an Invested Banker on the Gear Business," by Owen A. Locke, Tillotson-Wolcott Co., Cleveland; "Practical Value of Cost Accounting," O. C. Kiehne, Van Dorn Electric Tool Co., Cleveland.

General Gear Standardization Situation

As chairman of the general standardization committee, B. F. Waterman presented a report in which was outlined briefly the work of the various subcommittees on standardization. He stated that the bevel gear committee has worked out a nomenclature for bevel gears which will be of use to all users of gears, and he was satisfied that such a nomenclature is desirable. The worm gear committee has a recommendation which should be of great value as it tends to eliminate the great diversity of hob sizes due to having to meet customers' specifications. In his opinion the recommendation should be tried out for six months, after which definite action may be taken. He said that the need of something of this kind is apparent as the growing use of worm gear drive is making some action imperative.

The inspection committee has now completed its program, having submitted a recommended practice that was adopted at the last meeting, it indicated that it would appreciate suggestions for additions to the recommended practices. The composition gear committee has under consideration a revision of the standardization which Mr. Waterman had worked out in order to eliminate the charts that have been used, charts being objectionable to the American Engineering Standards Committee. Mr. Waterman declared that what is needed now is recommended practice in connection with standard spur gear hobs, for he believed more helical gears are made with these hobs than with any other kind. He said that the metallurgical committee has one of the best recommendations to be submitted, this covering the heat treatment of A. G. M. A. steels.

Mr. Waterman as its chairman also submitted the report of the association's sectional committee of the American Engineering Standards Committee. In this he again referred to the recommended practice for inspection of gears and stated that the sectional committee had decided that the recommended practice is hardly suitable to become an American standard but rather should be considered only as a recommended practice. This committee, he said, at the January meeting considered the nomenclature of gears and would submit a report that would be of much interest. The report also enumerated the proposed tentative American standards that have been submitted by the sectional committee on the standardization of gears. These include gears and pinions for electric railroad service, gray iron industrial spur gears, specifications for forged and rolled steel for gears, specifications for cast steel for gears and specifications for brass and bronze for gears.

To Finance Outfit for Testing Strength of Teeth

The report of the association's representatives on the A. S. M. E. research committee on gears was submitted by its chairman, E. W. Miller, Fellows Gear Shaper Co. He said that his committee was appointed primarily to investigate the effect of speed upon the strength of gear teeth with the use of special gear testing machine designed by Wilfred Lewis, who later discussed this machine in an address. Mr. Miller stated that the matter had now progressed to such a point that action on the developing of the testing device is warranted and that Ralph E. Flanders, Jones & Lam-

son Machine Co., had been authorized to solicit subscriptions from those who are interested in this research work. It will probably cost \$5,000 to build the machine and make tests, but he believes that \$2,500 additional should be provided.

The report on spur gears was made by its chairman, F. E. Eberhardt, Newark Gear Cutting Machine Co., who submitted a formula for determining the horse power of industrial spur gears, and asks the members to send suggestions on the formula to the committee. In a discussion of the strength of material factor in the formula, Mr. Waterman raised the point that the committee had not considered case hardened or heat treated gears. It was also suggested that there should be a standardization adopted for the smallest number of teeth to be used in cast iron gears and that the strength of material factor should be considered by the metallurgical committee. The following suggestions and recommendations were made in the committee's report:

"The horsepower that a gear will transmit, depends upon the quality of the material used, accuracy of the tooth-spacing, accuracy of tooth form, quality of the finish, rigidity of the shafts, bearing and housings, and the accuracy of the shaft alignment. A gear which is supported on only one side should be made with a comparatively narrow face. Gears should always be made for at least 25 per cent more horsepower than the rated load. If the drive is subject to a known or probable overload, the gears should be made strong enough for the full overload plus a margin of safety. This means that for such service as heavy rolling-mill work, reciprocating pumps, and similar duty, the gears should be designed with such overload factor in mind. The actual overload may equal 250 per cent of the rated load.

When using pinions with less than 18 teeth, the service may call for stronger teeth than the 14½ deg. standard. In such cases, it is advisable to consider the 20 deg. standard depth tooth, or a 14½ deg. tooth with long addendum. Pinions with low numbers of teeth may be used for comparatively slow movements and heavy work, but they are not so desirable for pitch line velocities above 800 ft. per min. On motor drives, and for ordinary industrial gearing where ideal conditions do not prevail, it may be necessary, for quietness, to use non-metallic pinions, when the pitch line velocities exceed 800 ft. If rawhide, cloth, bakelite or similar non-metallic material is not strong enough for the load, a combination of strength and quietness may be obtained by a laminated construction. When gears are mounted rigidly and supported on both sides, well made gears may be run in oil at pitch line velocities of 2000 ft. per min., both gear and pinion being made of metal.

Committee Reports Summarized

The herringbone gear committee, through A. F. Cooke, Fawcett Machine Co., submitted a formula for herringbone gears which will be distributed and discussed at a future meeting. He said that the plan of the committee is to standardize on hobs of a certain diameter for hobbing spur gears but the matter is still in a preliminary stage.

The nomenclature committee, through its chairman, F. E. Eberhardt, submitted a nomenclature for spur gears and announced that the committee will make definite recommendations at the semi-annual meeting.

During a general discussion of various phases of standardization, it was urged that the association should standardize on tooth curves, that inspection should start with tooth curves and that it should standardize on the tooth form for large sized beveled gears.

The committee on gears and pinions for electric railroad, mill and mine, through its chairman, W. H. Phillips, R. D. Nuttall Co., Pittsburgh, submitted a brief report in which it is stated that the changes as recommended by the sectional committee as to the method of specifying tolerances have been approved by the committee and can now be put in effect. The committee had decided to recommend no changes on key way tolerances or thicknesses of gear rims as it felt there is no immediate need for change on these items.

A report of the sprocket committee was submitted by G. N. Bartlett, Diamond Chain & Mfg. Co., who stated

that the report was about the same as submitted recently to the Society of Automotive Engineers, which had adopted it. He also stated that the A. S. M. E. committee had approved the report and he expected its adoption by that society. The report also included proposed roller chain standards and the proposed new sprocket tooth form recently approved by the association chain and sprocket committees and blueprints showing the designs of the proposed standard sprocket tooth and standard tooth form for block chain sprockets and cutter design and various tables.

The worm gear committee, through J. C. O'Brien, Pittsburgh Gear & Machine Co., made a program report and suggested that the proposed standard be tried out. He announced that the committee was preparing data on standard shaft worms.

The bevel and spiral bevel gear committee, through its chairman, F. E. McMullen, Gleason Works, submitted a progress report on the new system of bevel gears which has been worked out at the Gleason Works and which was the subject of a paper at the last annual meeting. He also submitted nomenclature of its standardization program. The report stated that the committee had attempted to complete this unit of its program as it is a basic part necessary for gear study and standardization. This is a subject that is now under active discussion by the American engineering standards sectional committee. It is planned to provide terms that are broad enough so that they apply to gears other than bevel gears when possible but the report stated that in some cases this is difficult. After some discussion of Mr. McMullen's report, the association adopted the proposed system of bevel gears as recommended practice for future design.

Poor Castings for Steel Gears

C. B. Hamilton, Hamilton Gear & Machine Co., Toronto, Canada, for the metallurgical committee said a recommended practice on steel castings will be ready to present at the next annual meeting. He declared that some foundries are not furnishing good enough steel castings for gears and that there should be a definite practice for inspecting, testing and rejecting these castings. Some castings were found to be no better than ingots. He remarked that the durability of castings running down to 0.20 per cent in carbon was not sufficient to suit many gear makers and announced that the committee will probably recommend two or more specifications for steel gear castings providing different specifications for the material for this class of work.

He also favored hardness specifications which would give the high and low hardness limits for good machineability, declaring there is a wide divergence of opinion as to machineability. He also referred to the various commonly used devices for testing the hardness of steel. Mr. Hamilton announced that a questionnaire will be sent out asking the opinion of manufacturers as to what is good machineability and also that at the next meeting a paper will be presented on furnace design. Referring to a previous report on carbonizing and case hardening, Mr. Hamilton announced that the committee had decided to call that report a symposium instead of a recommended practice.

Appointed Metallurgist for Association

In connection with the report of the metallurgical committee, Stanley P. Rockwell, metallurgical engineer, Hartford, Conn., presented a paper that proved of much interest on the determination of grade of steel by observation of the characteristics of the spark when the sample is held against an abrasive wheel. He illustrated his paper with actual demonstrations showing the difference in the spark produced in the grinding operation with the use of samples of different carbon analysis.

At a later session Mr. Rockwell was appointed metallurgist for the association. In this capacity the members can call upon him if they see fit to solve problems not covered in their routine metallurgical work.

Cost Accounting Problem Still Unsolved

Two papers were submitted on cost accounting, one by O. C. Kiehne, Van Dorn Electric Tool Co., Cleveland,

on "Practical Value of Cost Accounting," and the other by A. F. Cooke, Fawcett Machine Co., on "Hit and Miss of Cost Accounting." Mr. Cooke urged the adoption of a uniform cost accounting system, so that there will not be such a wide divergence in quotations on gears. He mentioned various specific cases in which there were marked differences in the prices which were quoted.

Following the papers, J. H. Dunn, R. D. Nuttall Co., Pittsburgh, chairman, submitted the report of the committee on uniform cost accounting, which stated that it is not practical to develop a uniform system that can be adopted to the last detail by each plant. All that is expected is that costs on the same product in different plants may be prepared on the same basis so that they may be comparable in detail. At present the figures on the same job in various plants as brought out in questionnaires vary up to several hundred per cent. In various efforts to arrive at some uniform principles the main difficulties found by the committee were the different interpretations of the meaning of the same accounting terms, such as direct labor, factory overhead, direct material and commercial overhead. The subject had been presented in various forms but comparatively few members had taken any interest in it. Figures secured by the committee indicated that the actual factory overhead, based on a percentage of direct labor, runs from about 150 per cent in busy periods to 300 per cent or more in dull periods, the average being about 150 per cent.

During a long discussion that followed members expressed widely divergent views but agreed on one point—that it was a very difficult question to solve. Mr. Dunn suggested that one general cost accounting committee with sub-committees might get somewhere. Otherwise he said that it would be necessary to follow a suggestion that had been made by Mr. Cooke to employ an outside firm of accountants. The suggestion was also made that it would be best not to try to solve the whole question at once but first take up the matter of dividing the shop overhead. Mr. Dunn further remarked that the committee had not been able to arrive at a uniform cost system that would apply to all gear industries. He finally attempted to pass the entire matter along to the executive committee and President Markland announced that that committee would probably take up the matter.

Taking Care of Labor Shortage

The report of the industrial relations committee, E. A. Kebler, temporary chairman, was read by W. H. Lyman. The report indicated that the supply of labor would be plentiful if properly distributed and urged employers to abstain from hiring men away from each other's plants. Mr. Lyman told how his company had recently solved the problem of labor shortage by sending a man down to the interior districts of Tennessee where about 80 young men were hired who will evidently make good shop employees. Mr. Markland declared that even if apprentices leave a plant after being trained, training should not stop for that reason. Workmen are bound to shift around and while one shop may lose men that it has trained, it will be getting others that have been trained in some other shop.

Mr. Lyman told of a plan proposed by the Remy Electric Co. to the Anderson, Ind., board of education and accepted. Under this plan the company agrees if business is good, to take high school boys in its shop one half of the time and pay them for their time. Other Anderson manufacturers immediately followed with the same plan. Mr. Waterman said that in Providence, R. I., a plan had been in effect several years under which one set of boys work in the shops one week and another set the following week. In this way the boys get a machine shop training. Reference was also made to factory schools in Syracuse, N. Y.

The inspection committee in a report read by E. J. Frost, Frost Gear & Machine Co., Jackson, Mich., announced that recommended practice for raw material will be submitted at the fall meeting. This committee will have the cooperation of the metallurgical committee in the preparation of its report. In the discussion the subject of gear noises was brought up and the sug-

gestion was made that noises be magnified to learn their cause.

Daily Use of Microscope by Gear Maker

E. C. Smith, metallurgist, Central Steel Co., Massillon, Ohio, in a paper on "What Does the Microscope Tell Us?" referred to the importance of the use of the microscope in the examination of steel used in the manufacture of gears. He said that the study of hardening gears and other parts has developed into the modern heat treatment and the microscope has played an important part in the analysis of conditions encountered. In the study in the manufacture of carbonized steel for gears the microscope is the most definite aid to the gear man, being particularly true because the structures of carbonized steel present considerable contrasts. With microscope examination made before quenching, car lots can be rejected before being unloaded.

In making alloy steel for the manufacture of gears and other products, a great deal of stress is placed on the complete removal of surface defects. Sometimes mills think that users are over critical. The usual point made is that if the defect machines or grinds out, the piece will be satisfactory. In many cases this is true but in many other cases it is only partly true. He said that the daily use of the microscope in solving problems was exemplified by a series of micro-standards established by a gear manufacturer to explain his difficulties. He showed five photographs of actual gear heats that represented the range of conditions encountered.

Mr. Smith declared the use of alloy steels as casting materials is a field that should be developed more thoroughly, as the improvement of the product is very pronounced and by the use of alloy steel the weight of gears has been reduced 50 per cent.

Advocacy of Hardened and Ground Gears

In a paper on "Grinding and Measuring Involute Gear Teeth," E. J. Lees, Lees-Bradner Co., Cleveland, said that the tendency is toward the use of hardened gears and that this is especially true of automobile transmissions. Hard teeth are more efficient, and this being true it is very important that the gear blank be measured accurately in all operations and particularly in cutting the teeth, because after once being hardened, the teeth cannot be recut. Even if the gear is made correctly up to hardening there is no assurance that it will retain its accuracy during the hardening operation. After hardening the bore must be ground and if the gear is distorted it can be chucked only approximately correct. Grinding will eliminate inaccuracies.

The advantages of using hardened and ground gears is that irregularities can be corrected by grinding. As the bore is the first part to be ground, other grinding operations are controlled from the bore and will be true and concentric with it. This grinding calls for a machine that will first grind the face of the teeth smooth, grind the face a true involute or modification thereof and index the gear to assure correct spacing of the teeth. A description with lantern slides of the company's machine designed for this work and the method of operation followed. Mr. Lees said that ordinary methods of testing the teeth for profile and spacing could not be followed and since a perfect involute can be ground to within 0.0002 in. it is necessary only to know whether the gear is perfect. To determine this, this company developed a profile testing machine, the principle of which is that a point unwound from a base circle which is concentric with the gear will trace the involute profile of the tooth.

Peak in Prices in October

K. L. Herman, Studebaker Corporation, in an address on "Tooth Forms of Automobile Gears after Cutting, Hardening and Grinding," said that in trying to locate the source of gear sounds he had checked the tooth form and had found that the sound depends on the form of the gear cut. He stated that gear grinding and gear checking is now receiving the attention of many car builders and valuable results are expected. Attempts to provide noiseless gears will probably lead to the introduction in plants of more definite means for checking and recording the noise. He had used a dicta-

phone for checking the sounds. He showed in lantern slides fixtures used by his company in checking gears.

At an informal dinner Thursday evening, Col. L. P. Ayres, Cleveland Trust Co., predicted that the peak of the present upward price movement would not be reached until October, when he looked for some slowing down in business due to inadequate transportation facilities and the scarcity of labor. He declared that the condition of credits is better now than at any previous time in the history of the country. At an informal dinner Thursday evening, R. S. Holding, Jr., Brown & Sharpe Mfg. Co., gave an interesting talk, recounting some of his experiences during over two years spent in the Far East. At a luncheon meeting Saturday, Frank A. Scott, president Warner & Swasey Co., Cleveland, discussed industrial relations. He said that there are many phases to the problem which an employer must approach from the standpoint that a man wants to earn all he can. Formerly he favored a flat rate of pay but now he is of the opinion that in determining a man's pay consideration should be given to the volume and quality of his work and that he should be paid for what he can do.

Southern Ohio Pig Iron Association Meets with Engineers

A joint meeting of the Southern Ohio Pig Iron and Coke Association and the Ohio Section of the American Institute of Mining and Metallurgical Engineering was held at Columbus, Ohio, April 20. At noon the guests, numbering about 75, were tendered a complimentary luncheon at the plant of the Jeffrey Mfg. Co., the afternoon being devoted to inspection of the plants of the Jeffrey Mfg. Co., manufacturer of coal mining machinery, the Buckeye Steel Castings Co., manufacturer of electric and open-hearth steel castings; the blast furnaces of the American Rolling Mill Co.; the American Zinc Oxide Co.'s zinc pigments and wedge roasting furnaces, and the International Derrick & Equipment Co., where the hot process of galvanizing structural steel was witnessed.

In the evening a dinner was held at the Southern Hotel, at which R. H. Sweetser, president of the Southern Ohio Pig Iron and Coke Association, presided as toastmaster. The visitors were welcomed to Columbus by Professor Demorest, Ohio State University, and addresses were made by President Sweetser, C. V. Murray, secretary of the Ohio Section of the A. I. M. E., and F. Sharpless, national secretary, who gave the guests an outline of the plans for the annual meeting of his association, which this year will be held in Montreal, following visits to the mining operations at Cobalt, Porcupine and other places in Northern Canada.

Following the dinner moving pictures were shown of the making of open-hearth steel, coal mining operations, and the new wash process of coal cleaning developed by the American Coal Cleaning Co.

Slight Increase in Coke Production

UNIONTOWN, PA., April 23.—Coke production in the Connellsville region for the week ending April 14 showed an increase of only 1000 tons over the production of the preceding week. Furnace operations, unaffected by embargoes, have continued to increase their output, while the furnace operators have curtailed their production to meet the demands. Export production has been curtailed by reason of the embargoes which have been continued in effect at piers, although some tonnage is moving out of the region on permits. Quotations shaded off considerably during the past week, some grades being quoted as low as \$6, with a few "distress" shipments at even a slightly lower figure for furnace coke.

The Alan Wood Iron & Steel Co. has appointed Park & Williams, Inc., Real Estate Trust Building, Philadelphia, as selling agents for Swede pig iron in New England territory. This appointment becomes effective May 1.

Management of Moderate-Sized Plants

Problems Discussed at Convention of Industrial Engineers—
Health in Industry and Workers' Participation in
Management Subjects of Interest

THE tenth annual convention of the Society of Industrial Engineers, held in Cincinnati, April 18 to 20, was regarded by many as the most successful in the history of the society, both from the standpoint of attendance and subjects discussed. While most of the discussions were devoted to the major subject of the convention, "Effective Management of the Moderate-Sized Plant," a number were devoted to more general subjects, the most important of which was "How and to What Extent Can Employees Participate in Management?"

The "Three Phases of Management: Financial, Sales and Production," were discussed by Dr. Joseph W. Roe, president of the society, at the opening session. It was stated that there is no longer a stampede into trusts or large combinations, such as was the case twenty years ago, and that this was due to economic forces as much as to legislation. "More than one trust had lumbered into bankruptcy through inability to cope with its small, alert competitors," said Doctor Roe, but the large plant had a great advantage over the small one in the field of "purchases and sales." In actual production, however, the small plant can frequently compete with the large one on even or on better terms. At the same session C. U. Carpenter, general manager, Dayton Portable Typewriter Co., Dayton, Ohio, read a paper on "Scientific Administration—the Determination of Business Policy."

At a dinner meeting of the educational group, April 19, Prof. H. M. Gano, college of engineering, University of Cincinnati, in an address on "The Cooperative Educational Method—Past, Present and Future," outlined the history of the movement since its inception, and stated that at this time 225 distinct industries were benefiting through the cooperative educational method. The subject was discussed by M. E. Danford, American Rolling Mill Co., Middletown, and also by Robert Holz, Richardson Paper Co., Lockland, Ohio, the latter from the standpoint of the executive employing cooperative students.

Division of Labor An Economic Benefit

At the same session Ernest F. Du Brul, general manager, National Machine Tool Builders' Association, discussed "Economics and the Smaller Plants." Figures from the Census of Manufacturers, 1919, upon which he based his address, showed that the smaller shops whose annual output was less than \$100,000 constituted 79½ per cent of the number of establishments. The million dollar shops constituted only 3.6 per cent of the total number, yet they employed 56.9 per cent of the wage earners, while the smaller shops employed only 11.9 of the wage earners. "Looking at the value of the product we find," he said, "that the million dollar shops made 67.5 per cent of the product, while the smaller shops made only 7.5 per cent, and the value of the product increases with the size of the establishment, so that in the million dollar class it is twice as great as in the smallest shops. Deducting material from total value gives what in the census is called "added value," and here again we find a progressive increase from class to class. This item is the index of manufacturing effort. In this added value are included all explicit costs other than material, such as wages, salaries, taxes and expenses, all the implicit costs of depreciation and obsolescence, and of course the profits and losses. Unfortunately these items are not all separately given in the census report, and those that are given are not classified by size of establishment as are the value of product, value of material and number of wage earners, so that in analyzing the report, it is necessary to assume certain things, first in distributing the total capital employed over the different classes by value

of product; second, distributing the wages paid according to the number of wage earners, and third, deducting wages from added value to distribute the salaries, taxes, rents and contract work in proportion to the remainder to arrive at the residue. Following these assumptions, we note that practically all the significant facts that we are able to reveal point to a larger product and larger residue per wage earner in the larger shops, verifying statistically the economic principle that the division of labor is an economic benefit, not only in increasing product per man but also in increasing profit until a point of maximum efficiency is reached."

Urges Small Shops to Combine

That it is useless to rail at the concentration of industry in larger establishments, was emphasized by Mr. Du Brul, who pointed out that concentration grows by force of economic law, and only the exceptional small shop can successfully survive against it. "This hard fact is not thought out as well as it should be," he said "and many an ambitious man fails because he tries to do things all by himself that can better be done by a larger organization. He would do better to pool his own particular efforts with those of others possessing talents different from his. In the smaller shop the executive must of necessity do and study many things that he is not particularly fitted for. If men were to combine smaller concerns into larger ones, the principle of efficiency due to division of labor would work with them instead of against them, and the same amount or even a smaller amount of effort would bring them better reward."

A series of group meetings was held. The production group was addressed by Chester B. Lord, industrial engineer, National Automatic Tool Co., Richmond, Ind., on "Production Control systems for the Special Order Shop," and the personnel group by J. J. Davis, Paine Lumber Co., Oshkosh, Wis., "A Business Barometer—the Monthly Departmental Statement, Its Make-up and Use," was discussed by the accountants group.

A session devoted to "Health in Industry," under the direction of Dr. Carey P. McCord, director Industrial Health Conservatory Laboratories, at which physical examinations were made of living subjects, was a noteworthy feature of the convention.

Workers' Participation in Management Discussed

The concluding session of the convention was given over to a discussion of, "How and to What Extent Can Employees Participate in Management?" The workers' side was presented by John P. Frey, editor *International Molders' Journal*; the employers' side by Charles R. Hook, general manager, American Rolling Mill Co., Middletown, Ohio, and the engineers' side by John Calder, consulting engineer, Lexington, Mass. Daniel Bloomfield, Boston, editor *Industrial Relations*, who presided at the meeting gave a summary of surveys of 500 plans of employee representation made by him during the past few years. His conclusions were that, while some of them may have little value, all were sincere attempts to solve the problem of employee representation in management.

Mr. Frey said that he believed that conditions in industry are not satisfactory, and indicated that he did not know what the ultimate goal of the organized wage earner is in regard to employee representation. He said that he did not believe that the ultimate goal was the main problem, and that we should be more concerned with the problems facing us today. He attributed 81 per cent of the waste industry to management, 9 per cent to labor, and 10 to subsidiary causes.

The elimination of waste was emphasized as one of the problems of today, and it was his view that the only way waste could be eliminated was for the management, the efficiency engineer and the workmen to get together to discuss these problems. These three groups, he said, have not been wholly honest with each other, and have mistrusted each other's motives.

Mr. Hook's paper, read in his absence by M. E. Danford, said that the history of cooperative management in the United States was replete with failures. Business success demands of its followers a concentrated and vigorous attention which is not possible when men are trying to be workmen in the mill and at the same time direct the policies and carry on the management function.

Mr. Hook described how a number of years ago at his company's plant, an advisory committee was worked out to function instead of a grievance committee. The advisory committee had worked so well for fifteen years that when the expansion of war time caused a large increase in force the advisory committee principle was extended to cover all departments. He gave a résumé of the organization and functions of the advisory committee, the functions of which may be stated thus: First, to advise with and learn the policies of the general management; second, to convey to the employees an understanding of these policies and to reflect the sentiment of the employees on such matters as may be of help to the general management. The committees have no administrative, executive or legislative functions. The committee numbers about 137 members, chosen from an organization of 3500.

A proper understanding of the motives actuating the management of the business was emphasized by Mr. Hook as essential before the men who do the work will respond. When such motives are understood there arises a confidence in the purpose and integrity of the management which is the most valuable asset the business can have, resulting as it does in a cooperation which through the years builds a better and stronger body of men capable of growth and accomplishment. The result on the part of the working organization is a freedom from worry regarding their treatment and a satisfaction with their employment, while on the management side it permits continuous and intensive effort toward building better business, expanding its products and markets, improving its processes and practices, confident that the rank and file who are following are behind its efforts because of the mutual interest each has in the other and both have in the common goal. He believed that to this extent at least employees can participate in management. The better it understands the problems of management, its duties, its risks, its diversity of efforts, the less does labor desire to assume a part of them. The more certain employees are that they are receiving a square deal and sympathetic consideration at the hands of management the more content they are to pursue their own jobs and leave to the managers the duties which fall to their lot.

Extent of Workers Interest In Participation

Mr. Calder said that the question under discussion refers to industrial work and to the employment relation. It takes no account of the management of the business outside of production, such as finance, sales promotion and public relations. "With the latter," said Mr. Calder, "no plant worker, as such, can have responsible contact or in fact is seeking it. He may be, however, and often is, appreciative of information about these branches of business which furnishes him with a living. He will desire to take part in management only where his present personal interests are most affected and greater participation in the details of management will develop only slowly as his interests are broadened by education.

"The most hopeful prospect for employee participation in management," he continued "is for the employer to begin where the worker is at, rather than to invite the latter to take his stand at the employer's rendezvous. In industrial relations we must put first things first and every employer should enter this aphorism in his private notebook and read it often, namely, 'My employees, like myself, and the nation, reserve the right

to make their own mistakes.' Properly informed, supervised wisely and humanely and given full opportunity to express himself the worker will make few mistakes and will extend his interest gradually to co-operation about wider interests. What the worker wants arises out of what the worker is and no progress will be made where the latter is not fully appreciated.

"Let us inquire what is really on the worker's mind and, when that is satisfied by adequate self-expression and participation we may find that the average worker has about all he wants of responsibility for management and that any further advance waits upon education.

Personal Interests of Worker a Starting Point

"The wage earner wants to know how things happen, why things happen, and how he can reconcile these happenings with his keenly felt limitations and he is usually left to his imagination and the advice of outsiders whose explanations are frequently unreliable. Most workers want to count in management solely when their personal interests are concerned and he is a wise manager who begins industrial relations there. The workers are entitled to that privilege and they will not take much interest in technical management affairs in any plant while matters nearer their desires are denied democratic solution.

"Organized representation of all employees in the plant regardless of and without prejudice to the external affiliations which some of them may elect to have is the surest way of giving the workers a voice in the management where it touches them most closely. The worker in the plant where he, or his elected representatives, speaks out in privileged conference, untrammelled by his employer, his supervisor or any other agency, asks for neither a new heaven or a new earth. He is found to have numerous grievances easy of adjustment, which hurt more because of their steady neglect rather than from their urgency. The desires which the worker has at heart, which are first in his mind and esteem, are not a matter of guesswork. Those of us who have spent a lifetime of work alongside him are in no manner of doubt about them. They are, in order of their urgency: A steady job, adequate real wages, a good foreman, individual and collective voice in settling his conditions, and a chance to rise on his merits. These desires are ethical and they are reasonable. They express correctly what modern industrial relations should provide when wisely organized just as a matter of good business and good morals."

That the public interest in the matter should not be overlooked, was emphasized by Mr. Calder, who said that collective adventures of employees in production and distribution can only be successful when the participants have had some real responsibility already in the management of their economic interests. "The social tasks of civilized communities, namely the provision of surpluses of commodities and services and leisure to enjoy them, should increasingly utilize the intelligence and the will of all engaged in it" he said "and nowhere can such an aim be more constructively advanced than at the day's work under wise leadership and democratic conditions."

A general discussion followed the reading of the papers. Asked as to the views of organized labor on unemployment insurance, Mr. Frey said that the American Federation of Labor has not officially gone on record as favoring it or opposing it. Some unions favor such a scheme, but others oppose it, and he thought that the A. F. of L. would not favor it. On this subject Mr. Danford said that the scheme of unemployment insurance is economically unsound, and Mr. Calder stated that a small surplus of labor is necessary for expansion; in times of depression the State should supply some relief, but not in form of insurance.

McClellan & Junkersfeld, Inc., Philadelphia, have been awarded the contract for the erection of a new power and heating plant at the University of Pennsylvania, Philadelphia. The amount involved is about \$600,000.

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Ruhr Gains and Losses

The Ruhr occupation is turning out to be a benefit to the British steel industry, while it has set back that of France. British steel output in March was 802,500 gross tons, exceeding the record average of 755,600 tons per month in 1920, and the pig iron make of 633,600 tons was the largest since 1920. February figures, the latest available from France, show that pig iron production there had fallen to about 300,000 tons, or only 60 per cent of the volume in the late months of 1922. Steel at 290,000 tons made a slightly better showing. March figures are not yet at hand, but they will make a much poorer showing. The effect in Luxemburg was to cut down pig iron output in February to 62 per cent and steel production to 59 per cent of that for January. Demand for British steel and iron, both from domestic and foreign consumers, is rapidly approaching pre-war volume or better. The French industry, enlarged by its war acquisitions, has its new prestige seriously threatened by the cutting off of its fuel supply.

As between Germany and France the situation is a state of siege, an endurance test, in which each side solemnly avers it will never yield, but in which one side or both sides sooner or later will shift ground. To date two nations that of all engaged in the war can least afford further loss have lost heavily, while the United States and Great Britain, the two nations that come nearest to being prosperous, have gained. So far as her steel industry is concerned France is again suffering vicariously. By her march into the Ruhr she has cut off the flow of cheap German steel into many outside markets in which presently British and American steel makers will be operating at a profit.

Half a century ago the *annual* production of steel in the United States was less than the average *daily* production during March of this year. Figures for the total tonnage of steel ingots and castings in 1872 placed it at 142,954 gross tons. The production of ingots alone in March (last month) accounted for 146,500 gross tons a day, if we assume that the thirty companies reporting

to the American Iron and Steel Institute produced 86 per cent of the total. Adding 5000 tons as an estimate for castings, we have a total of 151,500 tons per day for March. This is 6 per cent more than the entire year's production of 1872.

Employing the Unfit

While much has been said lately, particularly in connection with the national immigration policy, about a shortage of common labor, there are many items of news of semi-skilled men being put in skilled jobs because not enough fully capable men are obtainable for such jobs. If there is a shortage of common labor in particular, one might expect a general survey to show many men doing work of lower grade than they are able to do. This does not seem to be the case.

Again, in periods of widespread unemployment it is frequently remarked that there are two classes of men idle, the unemployed and the unemployable, the point being that the total number of men idle is not a correct measure of the amount by which trade or industry is failing to function. At the present time the unemployable appear also to have jobs.

It would seem, therefore, that there is at present much employing of the unfit. Forward looking men may well concern themselves with the question what part this will play in the next period, when employers become less eager to disburse money in payrolls. The influence of present conditions upon the minds of many men is plainly bad. Men are being "spoiled." If a carpenter is forced for a time to dig ditches and then gets a carpenter's job again, he is likely to be a better carpenter than he was before. He may not have more skill, but he is likely to use his skill to greater advantage for both himself and his employer. But if a common laborer is allowed to be a "carpenter" for a time he is not likely to be as good a ditch digger when he gets back to such employment.

As a practical illustration, much of the labor unrest of the past four years has been traced to the circumstances of our war activity, when men and boys, and boys in particular, were given pay as skilled workmen after a brief training at some

one operation, which did not make them skilled workmen but gave them the impression that they were. Afterward they proved quite unwilling to accept the kind of work they were really fitted to do.

In a period of what is called industrial depression the curves of commodity prices and production do not coincide. Generally speaking, prices trend downward throughout the period, while the quantity of work done decreases sharply at first and then gradually increases.

The divergence is due not so much to physical conditions as to mental conditions. There is always work to be done and there are always some who can spend money and will if they are satisfied they are going to receive a *quid pro quo*. Early in a depression all workmen are not willing to do what they later become anxious to do, accept jobs they can fill even if the work is far below what they think they ought to have, and then give their very best to such employment. When men get to that point goods are produced more cheaply, they sell better and business revives further.

It goes without saying that when the employer finds he has less work to be done he lets the less fit men go first. He may pay the same wage rates as before, but his labor cost is decreased. In the early part of the next period of depression the country will be full of spoiled men, insisting on regaining employment for which they are not fully fitted. Then there will be talk that men should engage in construction work so as to relieve unemployment. But those who have both capital and plans will recognize that the unemployed are not men willing to return value received for the wages that could be offered.

The Metal Trades Convention

Two of the speakers who addressed the twenty-fifth annual meeting of the National Metal Trades Association in New York last week, Dr. G. W. Dyer and Sherman J. Lowell, had a viewpoint distinctly different from that of the usual speaker at such conventions. Although Dr. Dyer is a professor of social science at Vanderbilt University, Nashville, Tenn., he is also a farmer, as is also Mr. Lowell. It is noteworthy that these gentlemen are entirely out of sympathy with the radical program of the American Federation of Labor, to say nothing of much more radical propositions of other labor organizations. Mr. Lowell, as National Master of Grange, has traveled widely and has been in touch with thousands of farmers throughout the country. He pointed out clearly the impossibility of the farmers' acting in harmony with the labor unions, who have had the audacity to appeal to the farmers to help in reducing hours, raising wages and lowering the prices of farm products. Mr. Lowell is intensely opposed to blocs and has a broad, patriotic spirit. Men of his class are more likely to find themselves in harmony with progressive manufacturers than with radical labor agitators, and it was a happy thought of those who made up the program to bring Mr. Lowell to address the convention.

Another address worthy of special mention was

that of Arthur R. Baxter, a member of the State Senate of Indiana, who spoke on "Business Men and Politics." It is not unusual to urge manufacturers and other business men to take a more active part in politics, but Senator Baxter spoke from experience as a legislator called out of business life. He pointed out clearly how much a business man can accomplish in improving legislation, but also indicated that no matter how able a man may be or how exalted his motives, he is likely to be fiercely attacked and unjustly accused by professional politicians. Senator Baxter believes, however, that despite all the drawbacks to political life, business men should give more of their time and energy to public matters. It will be fortunate indeed if his success has the effect of encouraging others to make a like contribution of business talent to the public good.

In the clear-cut analysis of the legislative program of the American Federation of Labor by Walter Gordon Merritt, counsel for the League of Industrial Rights, in the thoroughgoing analysis of the immigration situation by Magnus W. Alexander, and in other features, the association maintained the high standard established during the twenty-five years of its existence.

Raising and Lowering Wages

The inevitable tendency of wage advances for individual groups of workmen is to reduce the real wages of all other workmen. This is a fact that is recognized more or less in theory, but it does not receive the general appreciation and application it deserves. Every wage advance, by increasing the cost of production, tends to increase the price others must pay for the commodity, and thus wages do not go so far. The cost of living is increased.

There are a great many persons whose real incomes have been reduced since 1913. They do not participate fully, if at all, in the wage advances that have occurred since then, while the purchasing power of their receipts has been reduced. This is equivalent to a reduction in wages.

After the armistice we had a great upward swing in wages and the cost of living and then a great downward swing. Of late the trend has been upward again. The advance in wages has been very considerable, while the increase in the cost of living has been relatively slight. We can look for a greater increase if this tendency of wages to advance continues.

In particular, the crafts that involve large numbers of men, such as coal mining and railroad work, have been faring better than others. They have obtained large advances on the strength of increased cost of living, but are able to avoid substantial reductions when the trend is the other way. The maintenance of the 1920 coal mining scale operates to make the earnings of every one else less than they should be. There has been much experience in the past few years of wage fixing by numbers, of large crafts, in point of number of workmen, being paid better than small crafts.

Certain great changes have occurred in the

industrial alinement by reason of the war and by reason of the great reduction in immigration. This country should be engaged in a readjustment whereby wage rates for different occupations should be brought into proper alinement with each other. If there were a proper alinement before the war there is not now, for wage rates do not bear their former proportions to each other. It is being said, for instance, that there is a shortage of common labor. If so, such work should be paid for at higher rates, relative to skilled work, than formerly obtained. Carpenters, bricklayers and other artisans in the building trades are receiving higher rates, proportionate to the general wage level, than they should, and thus the earnings of all others are virtually reduced, whether they build, buy or rent. There has been much lowering of wages and salaries in this indirect way. The suffering is just the same as if there were a direct reduction in dollars and cents received.

A Rail Prophecy That Failed

From the time of Mother Shipton, who predicted among other things that "Iron on the water shall float as easy as a wooden boat," there have been many predictions relating to the production of iron and steel and to their place in industry. The celebrated prophecies of Abram S. Hewitt were well founded and for many years his formula for the periodic doubling of American pig iron output was borne out in practice. Samuel Benner's predictions had attention and no little credence for a time, but eventually fell into disrepute.

Recent examination of the admirable reports written for so many years by the late James M. Swank, as general manager of the American Iron and Steel Association, throws interesting light on early estimates of the place of open-hearth steel. Commenting upon the fact that the tonnage of open-hearth steel rails had fallen off markedly in 1883 from the figures of the two preceding years, after the open-hearth rail had been introduced in 1878, Mr. Swank wrote: "No special significance attaches to decreased production of open-hearth steel rails in the last two years, as open-hearth steel will never be a competitor with Bessemer steel in the manufacture of rails."

It was commonly thought back there that the open-hearth furnace would figure mainly as a producer of mild steel; in fact, the author of this prediction could have reiterated it many years later. Even as late as 1902 the production of open-hearth steel rails was far lower than it had been in 1881 and 1882—this in spite of the fact that from 1876 rails of steel had been produced in larger tonnage than the wrought iron rails of the earlier era.

Our article in the issue of April 19, calling attention to the virtual disappearance of Bessemer steel in the production of rails, furnishes a curious commentary on Mr. Swank's prophecy of thirty-nine years ago. In 1922 open-hearth rails accounted for almost the entire production, Bessemer rails being scarcely more than 1 per cent of the total.

CORRESPONDENCE

The Use of High Silicon Pig Iron

To the Editor: We read with much interest your article of April 12, under the caption "Higher Silicon Pig Iron," in which one of your readers speaks of the dearth of No. 1 foundry and pig irons running in silicon up to 2.50 or 3 per cent. It is true that producers of foundry iron find it to their advantage to make No. 2 grade rather than the higher silicon at the prevailing differential, because of the higher fuel costs, and the reduction in tonnage incident to working a "hotter furnace." But your client can easily overcome his troubles by using a small percentage of Jackson County silvery running in silicon 7 or 8 per cent higher, if he chooses to use a greater percentage of scrap in his mixture.

Our Jisco brand of Jackson County silvery is made of virgin ore and no scrap is used. An ideal softener is produced which will take care of the imperfections of other materials used in the foundry mixture and produce a larger percentage of perfect castings, more easily machined. The uniformity of extremely low sulphur is shown in the following exhibit of analyses of casts for first half of April:

No.	Silicon	Sulphur	No.	Silicon	Sulphur
715.....	10.72	0.004	745.....	7.48	0.005
716.....	10.42	0.004	746.....	7.60	0.008
717.....	10.97	0.004	747.....	7.12	0.005
718.....	10.11	0.005	748.....	7.96	0.004
719.....	10.39	0.004	749.....	7.04	0.005
720.....	10.23	0.004	750.....	6.22	0.007
721.....	10.35	0.005	751.....	6.85	0.004
722.....	10.53	0.005	752.....	6.76	0.006
723.....	10.84	0.004	753.....	6.45	0.009
724.....	10.33	0.005	754.....	6.96	0.005
725.....	9.69	0.004	755.....	7.02	0.006
726.....	9.82	0.007	756.....	7.53	0.005
727.....	10.28	0.005	757.....	7.00	0.009
728.....	10.24	0.004	758.....	6.41	0.014
729.....	10.61	0.004	759.....	7.33	0.006
730.....	10.56	0.005	760.....	6.59	0.010
731.....	9.62	0.004	761.....	6.48	0.007
732.....	8.45	0.004	762.....	7.14	0.006
733.....	7.62	0.006	763.....	6.32	0.006
734.....	7.34	0.004	764.....	6.75	0.005
735.....	7.71	0.005	765.....	6.14	0.011
736.....	7.32	0.004	766.....	6.50	0.015
737.....	7.56	0.004	767.....	6.97	0.007
738.....	8.43	0.005	768.....	7.41	0.006
739.....	7.82	0.004	769.....	7.83	0.005
740.....	6.94	0.007	770.....	7.19	0.007
741.....	7.20	0.009	771.....	8.50	0.006
742.....	7.11	0.019	772.....	8.00	0.006
743.....	7.27	0.013	773.....	7.16	0.006
744.....	6.87	0.006	774.....	7.22	0.004

Of 425 casts since Jan. 1 there have been:

- 401 casts under 0.009 in sulphur
- 11 casts between 0.010 and 0.015 in Sulphur
- 3 casts between 0.016 and 0.020 in sulphur
- 10 casts over 0.020 in sulphur

We doubt if any charcoal operation can show any better sulphur record.

NOAH G. SPANGLER.

General Manager Jackson Iron & Steel Co.
Jackson, Ohio, April 19.

Higher Differential for Silicon in Pig Iron

To the Editor: We have read with interest your editorial in the April 12 issue of THE IRON AGE captioned "Higher Silicon Pig Irons." We, too, have had difficulty in obtaining the higher grades of silicon in our pig iron purchases, particularly the 2.75 to 3.25 per cent grade. This has caused us considerable inconvenience as well as money, due to the fact that we were obliged to purchase outside of our contract source of supply the higher silicon iron to maintain the analysis desired in our foundry heats. We have found this situation to have eased off somewhat during the past two months and we have not had the difficulty in obtaining the higher grades of silicon that we had in 1922.

We have been obliged to pay, however, a differential of \$1 a ton for iron to be delivered over the third quarter of this year for this higher silicon, while in the past we have been able to obtain it at a differential of 50c. a ton. We have not had, nor have we seen, any statement from the furnaces which would indicate that this increase for the higher grade is justified.

FOUNDRYMAN.

STEEL CORPORATION EARNINGS

Surplus Shown for the First Time Since First Quarter of 1921

The report of the United States Steel Corporation for the first quarter of 1923 shows a surplus for the first time since the first quarter of 1921, when the surplus was \$2,816,905 and represented the smallest net earnings since the second quarter of 1915. The deficits for the three quarters of 1921 and the four quarters of 1922 have been as follows:

	1921	1922
First quarter		\$6,749,468
Second quarter	\$4,571,668	1,462,345
Third quarter	6,965,504	1,339,602
Fourth quarter	5,280,901	1,375,356

The net earnings for the first quarter of 1923 were \$34,780,069, compared with \$19,339,985 for the first quarter of 1922 and \$32,286,722 for the first quarter of 1921. The earnings were the largest for any quarter since the first quarter of 1920, when they amounted to \$42,089,019. The surplus for the first quarter of 1923 was \$4,859,351. The earnings for January were \$10,561,241 and February was the low month with \$9,527,181, but a sharp recovery was made in March with \$14,691,647.

The usual quarterly dividends of 1 $\frac{3}{4}$ per cent on the preferred stock and 1 $\frac{1}{4}$ per cent on the common stock were declared.

Earnings for the first quarter of 1923 and the three preceding years were as follows:

Quarters	1923	1922	1921	1920
First	\$34,780,069	\$19,339,985	\$32,286,722	\$42,089,019
Second		27,286,945	21,892,016	43,155,705
Third		27,468,339	18,918,058	48,051,540
Fourth		27,552,392	19,612,033	43,877,862
Net earnings each year		\$101,647,671	\$92,708,827	\$177,174,126

The statement of the earnings for the quarter ending March 31 is as follows:

Earnings		Less:		Balance of Earnings
Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding		Interest on the Subsidiary Companies' Bonds Outstanding		
January, 1923	\$11,259,788	\$698,547		\$10,561,241
February, 1923	10,225,251	698,070		9,527,181
March, 1923	15,389,636	697,989		14,691,647
	\$36,874,675	\$2,094,606		
Net earnings				\$34,780,069
Less, charges and allowances for depreciation and sinking funds on bonds				12,252,744
Net income				\$22,527,325
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding	\$4,751,774			
Premium on bonds redeemed	257,500			5,009,274
Balance				\$17,518,051
Dividends on stocks of the United States Steel Corporation, viz.:				
Preferred, 1 $\frac{3}{4}$ per cent	\$6,304,919			
Common, 1 $\frac{1}{4}$ per cent	6,353,781			12,658,700
Surplus for the quarter				\$4,859,351

U. S. Court of Appeals Decides Patent Case in Favor of American Stainless Steel Co.

The United States Circuit Court of Appeals, in session at New York, has handed down a decision in the case of the American Stainless Steel Co. against the Ludlum Steel Co., appealed from the decree in equity entered in the District Court for the Southern District of New York. The court decided in favor of the American Stainless Steel Co., which holds both the Brearley and Haynes patents, as well as other patents on non-corrosive ferrous metals. The attorneys for the Ludlum Steel Co. tried to show that the Brearley and Haynes patents interfered, but the court held that Haynes' is the generic and Brearley's the specific patent. Haynes' covers unhardened chromium-carbon alloys. Brearley's

covers hardened and polished articles, such as cutlery of the described composition.

In the decision of Judge Hand in the lower court, it was held that the disclosure or description of method of working stainless steel was insufficient for certain compositions, including the Ludlum composition. The judge considered the disclosures from the point of view of a cutlery maker who does not ordinarily have a metallurgical laboratory. The Appellate Court has decided that the disclosure was intended for steel makers who ordinarily have metallurgical laboratories and that for them the disclosure is ample.

The former decree is reversed and the case remanded to the district court to determine costs and take any other proceedings which may be necessary.

Hydraulic Steel Co. Will Not Enter Proposed Merger

The Hydraulic Steel Co., Cleveland, has decided not to enter a proposed merger of that company with the Parish & Bingham Co., Cleveland, and the Detroit Pressed Steel Co., Detroit. Merger plans have been on the way for some time. The three companies are large manufacturers of automobile frames. According to announcement of J. H. Foster, president of the Hydraulic company, that company has made arrangements for certain necessary financing in connection with its decision to continue to operate independently.

Output for Ford Motor Co.

The Ford Motor Co. had a record week ending April 10, producing 37,793 vehicles for domestic use and exceeding the previous week by 1649. This is the first period of sustained production on a 6000 per day basis, the highest being 6406 completed cars and trucks and the lowest day totaling 6153. The company reports sales of 41,681 trucks during the first quarter of the year. March sales reached the new high mark of 18,717 which exceeded the total sales for the first quarter of 1922 by 1131, and were 50 per cent above February.

COMING MEETINGS

April

American Foundrymen's Association. April 28 to May 3. Annual convention and exhibition. Public Hall, Cleveland. C. E. Hoyt, 140 South Dearborn Street, Chicago, secretary.

May

National Foreign Trade Council. May 2 to 4. Annual convention, New Orleans. O. K. Davis, 1 Hanover Square, New York, secretary.

American Electrochemical Society. May 3 to 5. Semi-annual meeting, Hotel Commodore, New York. Colin G. Fink, Columbia University, New York, secretary.

American Association of Engineers. May 7 to 9. Annual convention, Norfolk, Va. C. E. Drayer, 63 E. Adams Street, Chicago, secretary.

National Pipe and Supply Association. May 15 to 16. Convention at Cincinnati. George D. McIlvane, 909 Oliver Building, Pittsburgh, secretary.

American Iron, Steel and Heavy Hardware Association. May 15 to 17. Annual convention, Drake Hotel, Chicago. A. H. Chamberlain, Marble Building, New York, secretary.

National Association of Purchasing Agents. May 15-19. Annual convention, Cleveland, Ohio. H. R. Heydon, 19 Park Place, New York, secretary.

National Supply & Machinery Dealers' Association, Southern Supply & Machinery Dealers' Association and American Supply & Machinery Dealers' Association. May 17 to 19. Triple convention, Hotel Sinton, Cincinnati. F. D. Mitchell, 1819 Broadway, New York.

American Society of Mechanical Engineers. May 28 to 31. Spring meeting at Montreal, Quebec. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

THE ENGINEER IN HISTORY

London's Newcomen Society Seeks American Cooperation and Memberships

A number of editors of journals concerned with engineering attended a luncheon at the Bankers' Club, New York, given by L. F. Loree, president of the Delaware & Hudson Co., and J. R. Dunlap, editor-in-chief of *Industrial Management*, on Friday, April 20. The guest of honor was H. W. Dickinson, curator of South Kensington Museum in London, who had come to the United States to enlist the interest of engineers in the Newcomen Society. Mr. Dickinson is secretary of the society, which was formed at Birmingham, England, in 1919, by engineers who had met to celebrate the James Watt centenary.

Mr. Loree, in introducing his guest, told of his own visits to the South Kensington Museum, where he had seen, among other engineering landmarks, Stephenson's Rocket and the original Newcomen engine, and expressed his interest in the success of Mr. Dickinson's mission to this country. Mr. Dickinson followed, ex-

plaining that the object of the Newcomen Society is to foster the study of the history of engineering and industrial technology and to preserve records of engineering work and industrial processes. He asked for the active membership and interest of American engineers. Other speakers were Mr. Dunlap, Henry R. Towne, William L. Saunders, Fred R. Low and David Beecroft, all of whom favored the cooperation of American engineers in Mr. Dickinson's proposal. Mr. Beecroft, referring to the automobile industry and its 31 years of history, spoke of it as one field of engineering in which the pioneers are still on the ground, so that it is possible to make accurate records of the earliest achievements from first-hand information.

Mr. Dickinson during his stay in this country will present the work of his organization to representatives of the various engineering societies. The membership fee in the Newcomen Society is £1 a year. One of the lines of work carried on is the collection of biographical matter concerning men who have contributed to engineering and industrial progress. Each year a volume will be printed containing original memoirs by members, bibliographical notes and historical material not generally accessible.

ORE RATES REDUCED

New Schedule for Old Ranges Announced by Interstate Commerce Commission

WASHINGTON, April 24.—Reductions of from 4c. to 9c. per gross ton in line haul rates on iron ore from old ranges in Michigan and Wisconsin to the upper lake docks were ordered in a decision announced yesterday by the Interstate Commerce Commission. The lowered rates are to become effective not later than June 11. As a result, blast furnace interests using ore from these old ranges will get the benefit of the cut in the rates for part of this season's shipments. Assuming that it requires two tons of ore to make one ton of pig iron, the reduction in costs of producing iron as a result of these rate decreases will be only from 8c. to 18c. per ton. The rates on iron ore from the Minnesota ranges, which the United States Steel Corporation roads serve were left unchanged, being found not unreasonable. The commission also maintained the dock charge of 10c. per gross ton.

The decision was handed down in connection with the complaint of the Adriatic Mining Co. et al., versus the Chicago & North Western Railway Co. et al. The complainants are identified with the independent steel interests and represent a large portion of the ore output in the Lake Superior region.

The Marquette, Menominee and Gogebic, the old ranges whose rates were ordered reduced, shipped 13,114,000 tons of ore in 1922, as compared with 30,763,000 tons shipped from the new ranges, the Mesabi, Vermillion and the Cuyuna, whose rates are left unchanged.

Following are new rates ordered, effective June 11 and the present rates, stated in cents per gross ton:

Origin Territories	Destinations	Rates Ordered	Present Rates	Dock Charges
Gogebic range in Michigan and Wisconsin	Ashland, Wis.	72	81	10
Menominee and Marquette ranges in Michigan.....	Escanaba, Mich.	72	81	10
Mines at Ishpeming and Negaunee in the Marquette range	Marquette, Mich.	54	58	10
All other mines in the Marquette range	Marquette, Mich.	63	68	10

The commission pointed out that great changes in the relative amount of tonnage handled by the two Steel Corporation roads and the Great Northern had taken place in the past 10 years to the detriment of the Great Northern. It also showed that while the increase in rates generally in the western district was 52 per cent, the increase in rates on ore, since the decision

in the Lum case on April 5, 1915, was only 42 per cent. It also incorporated in its report figures submitted by the defendants showing greater percentage increases in the price of ore, and the rates of the ore carrying ships; all for the purpose of showing why it came to the conclusion that, on the long hauls, there should be no reduction in rates. Cost studies as to transportation from the mines in Michigan and Wisconsin, requiring shorter hauls, led it to the conclusion that some reductions should be ordered.

Standard Oil Co. Employees Given Week's Vacation with Pay

At the annual joint conference and dinner of the Standard Oil Co. of New Jersey and its employees, held at Newark, N. J., April 19, it was announced by President W. C. Teagle that beginning this year a vacation of one week with pay would be granted to every wage earner in the manufacturing department who has been in the employ of the company for one year. It was also announced that the 48c. employing rate for common labor will be abolished in the three New Jersey refineries. The employing rate becomes 53c., and after six months' service the common laborer will be put on the rate of 57½c. Previous to this announcement, the men were hired at 48c., raised to 53c. after six months and to 57½c. after one year.

New High Records in March Production

Department of Commerce figures show that several lines of raw and finished products made new high records in March, while others gave the highest results in many months. Increasing consumption apparently digested the goods produced without appreciable increase in stocks.

Cotton consumption by textile mills, 623,105 bales, exceeded by 8000 bales the previous high record month, May, 1917. Production of bituminous coal, except for January, 1923, and March, 1922, was the highest for any month since 1920. More anthracite coal was mined than in any previous month since August, 1918. Residential building construction was the greatest for any month on record. Output of pneumatic tires and consumption of crude rubber were the highest since monthly figures have been collected. Retail sales and sales of mail-order houses exceeded those of every month since 1920, when prices were much higher.

Diamond Alkali Co., Pittsburgh, has just placed a contract for 37 improved type combination coke and gas ovens, together with by-product and benzol plant installations, with Koppers Co., Pittsburgh, for construction at Alkali, Ohio.

FOREIGN BUYERS QUIET

Arrivals from Germany on Old Contracts Depress Japanese Market—More Tin Plate Bought

NEW YORK, April 24.—Foreign business is generally declining. Although inquiries continue at intervals from most foreign markets, the number of orders being placed is proportionately small. Exporters to various world markets attribute this decline in foreign business to a number of causes, most of which are directly or indirectly connected with the situation in the Ruhr. European buyers find prices high and deliveries too extended in most instances. In the Far East, Japan and China, prices and deliveries are partly the cause of the present restraint in purchasing and added to this is the feeling that there is a possibility of a decline in the American market. Prospective purchasers are inclined to await price developments in the United States and should the market here show a decidedly upward tendency purchases would probably be resumed. In addition to this mental attitude on the part of Japanese merchants, there is the fact that lower priced German material purchased several months ago has continued to appear in the Japanese market. Mills in the Ruhr holding contracts with foreign purchasers turned these contracts over to finishing mills in the unoccupied section of Germany and the resulting receipts of German iron and steel in Japan have had a depressing effect on prices.

With the exception of the tin plate, purchased by the Nippon Oil Co., buying by Japan lately has been largely confined to special material, such as zinc sheets, electrical sheets, hoops, etc. The Nippon Oil Co., which closed a week ago on 16,500 boxes of tin plate, has since then awarded a total of 9200 boxes, 7500 boxes of 14 x 18 $\frac{3}{4}$ -in. size and 1700 boxes of 10 x 29 in., to Takata & Co., New York. The quotation on this tonnage, c.i.f. Japan, is said to have been about \$6.90 per base box, about 10c per box higher than the quotation submitted on the previous lot of 16,500 boxes.

Among current inquiries is a request for bids on

about 40 tons of high carbon and high speed tool steel and another inquiry for 100 tons of electrical sheets. The export house handling this inquiry reports having recently purchased 100 tons of electrical sheets for shipment to Japan, and another Japanese export house closed about ten days ago on 200 tons of electrical sheets for a subsidiary company which manufactures electrical equipment.

The Imperial Government Steel Works in Japan continue to exercise a fairly firm control over the market on plates, shapes and bars. The present quotation on shapes and plates of the Imperial Government works is practically equivalent to the current British price of about £14 per ton, c.i.f. Japanese port, and a factor in the Japanese seller's favor is the prompt delivery offered, compared with four or five weeks on British material.

Although there has been but little buying of copper in the American market by European consuming centers, the imports of copper by both Germany and France are said to be extremely heavy. In the past few weeks one large German interest has purchased 2500 tons in one lot and contracted for about 4000 tons more, but the business was transacted in the London market. Probably some of this copper is being delivered directly from Chile mines on old contracts with the present sellers. The reason for the business being placed in European markets is said to be the present margin of difference between the American and European delivered prices. Even Spain, a copper producer, has been active in a small way in copper purchases lately.

Goldsmith & Co., 116 Broad Street, New York, are seeking mill quotations for export on 536 tons of round steel bars, both ordinary merchant grade and of 7000 kg. tensile strength. The inquiry calls for bids on 460 tons of round bars, 5mm. in diameter and 250 cm. long, 7000 kg. tensile strength, f.a.s. Atlantic port from June to August and a smaller tonnage of 5mm. and 6mm. round bars, 516 cm. long, f.a.s. Atlantic port in June and July. Considerable difficulty has been encountered in finding a mill in a position to quote on this tonnage for the delivery specified.

FRENCH MARKET QUIET

Prices Weaken as Buyers Hold Aloof—Coke Supplies Improve—Fewer Furnaces in Blast

PARIS, FRANCE, April 5.—The number of blast furnaces in operation in France on Jan. 1 was 116; on Feb. 1, 90; and on March 1, 77. On March 1 there were 93 furnaces ready to be put into blast and 49 in construction or under repair. Among the 48 furnaces in blast in Lorraine and the East on March 1 several were being operated on a reduced schedule. A few days ago the number of active furnaces had decreased to 74, of which 46 were in the East and Lorraine and 28 in other parts of France.

The French production of pig iron in February was 305,526 metric tons, 180,684 tons less than in January and 207,762 tons less than in December.

The steel production in February was 289,787 tons (of which 1793 tons were castings), 117,944 tons less than in January. Lorraine produced 101,356 tons of the total February pig iron production and 8484 tons of the steel total.

These figures show a decrease in the French production of pig iron in February of 37.1 per cent (48.2 per cent in Lorraine) from the previous month, and a decrease in the production of steel of 28.9 per cent (41.7 per cent in Lorraine).

Coke Arrivals Increase

It is felt that the French iron and steel trade has now seen the worst of the situation created by the occupation of the Ruhr. As a result of the seizure of coke from existing stocks in the coal field, arrivals of German coke in France, while still small, have nevertheless increased, varying from one to three trainloads per day. In addition, shipments of Belgian coke have

been resumed, and other sources of supply are yielding all that can be expected. These include Britain, Holland, Czecho-Slovakia and the United States. The tonnages of American coke, which were recently purchased by the Société des Cokes de Hauts-Fourneaux, as well as, directly, by some French metallurgical firms, are eagerly expected. It is reported that there are now two or three blast furnaces that could be blown in in Lorraine.

Lower Prices Expected

Everything points to prices of iron and steel products having reached the peak, and in some instances they are receding. Producers are less inclined to continue quoting variable prices and are reverting to firm offers. However, consumers, who are bent on obtaining still lower prices, are generally refraining from ordering except for immediate needs. Consequently, the market continues quiet.

A rapid decline of prices is not expected, partly because the duration of the Ruhr occupation may be long and even after a settlement has been arranged, the scarcity of iron and steel will persist for a long time as a result of the arrears to be made up on the French works' order books. In addition, following a settlement of the Ruhr situation reconstruction work in devastated areas would become extremely active, and this activity would be reflected in the firmness of the iron and steel market.

Foundry Iron.—Chill cast foundry pig iron No. 3 P. L. is now quoted at 500 to 505 fr. per metric ton, at furnaces in the East or Lorraine. For export, 480 fr. at furnaces (500 to 505 fr. f.o.b. Antwerp) has been accepted for a few small tonnages. At the beginning of this week, 525 fr., delivered in the Parisian area, was quoted for Cleveland No. 3 G. M. B. Hematite pig iron is now more generally offered. A company in Meurthe-et-Moselle is quoting hematite at 550 to 600

fr., delivered, while Le Boucau in the southwest of France is selling at 575 fr. at furnace. British East Coast hematite mixed numbers is being quoted at 575 fr., delivered Paris. Synthetic hematite is offered at 540 fr., producing works in Savoie.

Steel Products.—The reduction in the steel output in February was particularly great in basic steel, which shows a decline of nearly 100,000 tons compared with January, while open-hearth steel totaled 121,200 tons in February, against 149,650 tons in January and 143,400 tons in December.

A few steel works, whose order books are nearly clear are willing to make concessions. A reduction of 50 to 100 fr. has thus been effected on heavy rolled products, for delivery within one or two months.

With the approach of summer and the increase in building a keener demand for beams, angles and sheets is noticeable. Prices, however, are much discussed by purchasers. They are about as follows for basic steel at producing works:

	Fr. Per Metric Ton
Beams	800 to 820
Rolled merchant products.....	850 to 880
Heavy sheets.....	900 to 950

Heavy sheets of open-hearth steel are quoted at 950 to 1,000 fr. at mills in the center of France. Sheets are in great demand but scarce.

It is generally believed that prices of rolled merchant products will probably soon recede from the level of 850 to 880 fr. and settle down to 700 or 750 fr. per ton.

GERMAN TRADE DEPRESSED

Mark Stabilization Considered as Serious as Ruhr Occupation—Stock Accumulations in Ruhr

BERLIN, GERMANY, March 29.—Serious depression threatens German industry. Those chiefly affected are the non-metal using branches, in particular textiles and leather, but the metal finishing industries will also probably suffer, while the heavy iron and steel producers, as a result of the shortage, will probably continue to work at capacity. The determining influence is not the Ruhr occupation, but the practical price equilibrium attained as a result of the stable mark exchange, following the exchange recovery of early February. No longer threatened by higher prices the domestic consumer shows reserve, and is delaying purchases in expectation of a price decline. In February, for the first time since June, 1921, general prices fell; and the indices for April 1 will show a further moderate decline. A dominant factor is the reduction of the coal tax from 40 to 30 per cent, in connection with a small reduction of the net price of coal. The effective coal price, including tax, is thereby reduced by about 16 per cent. The coal tax was raised from 20 to 40 per cent a year ago because German coal prices were far below the world-market but this disparity has largely disappeared as a result of the mark improvement, and there has been a general demand for reduction of the tax.

Prices of iron and steel have not changed during the past month. The last reduction in pig iron was on Feb. 24, and left prices as follows, in marks per metric ton:

Hematite	678,300
Foundry iron No. I.....	648,300
Foundry iron No. III.....	645,300
Spiegel steel-making iron.....	896,700
Spiegelisen, 8 to 10 per cent.....	1,003,600

The last alteration of Steel Syndicate prices took place on Feb. 21, when the schedule was cut to the following:

	Marks per Metric Ton
Ingot	749,000
Blooms	837,000
Billets	890,000
Slabs	970,000
Structural forms	1,034,000
Bars	1,043,000
Wire rods	1,112,000
Sheets:	
5 mm. and heavier.....	1,176,000
3 to 5 mm.....	1,321,000
1 to 3 mm.....	1,518,000
Less than 1 mm.....	1,649,000

As a result of cutting off the Ruhr supplies the relation of German coal and iron prices to foreign has become important. In the last week of this month Middlesbrough foundry iron No. III was being delivered at Hamburg c.i.f. cheaper than German No. III including freight to Hamburg. The English metric ton price on Mar. 22, at an exchange sterling of 98,000 marks was 645,374 m., the German price with freight 686,480 m. The difference is so slight that a small rise in English sterling prices or a slight mark exchange improvement would obliterate it. At a dollar exchange of 20,800 m., which is about the recent average, American pig iron without freight is slightly dearer than German, and the cost of carriage to Europe would place it far above the German. English coal at Hamburg on Mar.

22, cost 191,588 m. per metric ton, German c.i.f. Hamburg 160,576 m. In both iron and coal, the distance of the consumer from Hamburg or from the German source of supply is a determining factor. Many Germans buy foreign coal and pig as willingly as native. The policy of supporting the mark exchange made this possible. Whether the mark will be maintained at about 21,000 to the dollar is doubtful. The public bought only about one quarter of the \$50,000,000 new gold treasury bills, but as the banks have guaranteed that half the total asked for will be subscribed, the Government will have at its disposal \$25,000,000, of a present paper-mark value of 500 billion marks, for supporting the mark exchange. As the inflation is going on headlong, the note circulation having increased from 2,280,000,000,000 on Dec. 31 to 4,272,000,000,000 on Mar. 15, the present mark exchange cannot be permanently maintained by any other means than a drastic financial reform, of which there is thus far no sign.

Wages have rapidly risen, and in no trade have they fallen since the mark recovery. In February the average wage of a skilled married iron or steel worker in 20 cities was 59,108 m. per week, a married unskilled worker 54,834 m. At the exchange of Feb. 1, (41,603) these were under \$1.50 a week; at the exchange of Feb. 28, (22,756) well under \$3. The rapid rise in nominal wages is shown by the following: If the wage of the married skilled worker in July, 1914, is taken as 1, it was 24 in April, 1922, and 1,630 in February, 1923. The corresponding figures for a married unskilled worker are: 1; 34; 2,326, so that the unskilled workman has received much higher wage increases than the skilled.

The abnormal conditions produced by the Ruhr occupation and transport embargo have been in great measure surmounted and there is no evidence as yet of a collapse. The critical question is how long the furnaces and steel mills in occupied territory can go on producing for stock and paying wages out of borrowed money. The Ruhr smelters have large reserves of ore. Until lately ore deliveries were not hindered, the reason being that in Germany's tariff, which the French took as basis for their customs measures, ore is duty free. Later the French began to impose a 10 per cent duty on imported ore, whereupon deliveries ceased, as the Germans refused to pay; but on English representations the 10 per cent was again abolished. The French, however, insist on a stamping of bills of lading, and as Germany has forbidden this, the ore import is for the moment paralyzed. The local demand for Ruhr iron and steel products continues extraordinarily active. The supply of unoccupied Germany's needs is achieved by importing pig iron, semi-finished material, bars, sheets, etc., from Britain and Sweden. Czecho-Slovakia is supplying wire-rods, and is sold up for some time. Upper Silesia is also delivering material. Many manufacturing consumers in unoccupied provinces have taken advantage of the improved and stable mark to lay in large reserves of foreign steel and iron, and some of these foreign purchases have been made at less than domestic prices. The recent rise in world-market gold prices is however tending to check this importing.

Export from occupied territory to foreign countries has almost entirely ceased, as a result of the fixed German policy of boycotting and ignoring all French

regulations. The works have informed foreign customers that they are prevented by circumstances beyond their control from fulfilling their delivery contracts; but that they are still willing to deliver if the buying country can by means of diplomatic representations induce the French to suspend their regulations. The important Siegen iron industry is reported to be fully occupied, but it has great difficulties to overcome. Normally, the Ruhr imported iron and manganese ore, lime, etc., from the Siegen district, and delivered in exchange coal, coke, ingots, billets, slabs, bars, heavy sheets, etc. The Ruhr also bought Siegen thin sheets and small iron goods. The Siegen works have so far withstood the loss of Ruhr fuel and heavy materials,

but they are suffering from loss of a selling market; and sheets are being largely produced for stock. The Siegen combined smelting and rolling mill works are fully occupied, using largely British coal, and either Siegen local or Hessian "braun-eisenstein" ore. The sharp fall in the price of scrap has helped smelters. In the Lower Silesian companies a boom has prevailed for three months; the stoppage of Ruhr supplies has given Lower Silesia an important position as deliverer to unoccupied Germany, and shortage of skilled labor is the chief obstacle met. For farm machinery there is a great home demand, replacing export business to Russia and Poland, which has fallen off. The foundries have also profited from the Ruhr situation.

BELGIAN MARKET QUIET

Coke Prices Rising—Iron and Steel Prices Held Fairly Firm—Sheets Active

ANTWERP, BELGIUM, April 4.—Manufacturers, because of the continued upward tendency of raw material prices, especially coal and coke, are endeavoring to maintain high prices, and as far as possible are refraining from making concessions to buyers. Buyers, on the other hand, are inclined to demand lower prices, relying upon the fact that the recent fortnight's dullness has caused makers to stock a considerable part of their production.

The coal situation is about the same. Much larger tonnages than are offered could be sold and the production is slightly decreasing as a result of the departure of many coal miners at this season to work in other trades. Coke is still extremely scarce and bonuses above the official schedule are often paid, in some cases totaling as much as \$1 above the government price. Coke makers are raising prices as high as possible, based on the increased cost to them of coking coals, and some are even demanding higher quotations. The future of the coke market is largely dependent upon the developments in the Ruhr situation.

Large arrivals of coke from the Ruhr for France and Belgium are reported, but unfortunately actual receipts have not been as large as expected from these announcements. Some good-sized tonnages of British

coal are arriving at Antwerp, but these are deliveries on old contracts and the constant firmness of the British market makes it difficult to place new orders. Definite announcement on the projected strike of coal miners in England is awaited anxiously in Belgium, as a strike in Britain at this time would have a decided effect upon the Belgian market.

The iron and steel market is not at all easy, a few small orders mostly for spot shipment being reported during the past week. Some of these orders are reported to have been at reduced prices, but this weakness seems to have been only temporary and in spots, as the tendency is now upward. A fairly large business has been done in sheets. Inquiry for a wide range of material is heavy, many merchants who purchased iron and steel in Germany before the occupation of the Ruhr having finally given up expecting fulfillment of these contracts. The following prices for domestic delivery are as follows, per metric ton, f.o.b. works:

Commercial iron, No. 2.....	725	\$40.30
Commercial iron, No. 3.....	775	43.00
Commercial iron, No. 4.....	900	50.00
Heavy sheets	750	41.60
Light sheets	1,100	61.20
Rails, first quality.....	700	39.00
Rails, second quality.....	600	33.20
Commercial bars	750	41.60
Beams, heavy	750	41.60
Ingots, Bessemer	600	33.20
Billets, Bessemer	700	39.00
Ingots, Bessemer, Luxemburg.....	620	34.40
Billets, Bessemer, Luxemburg.....	660	36.60
Ingots, Bessemer, Lorraine.....	630	35.00
Billets, Bessemer, Lorraine.....	680	37.80

Machine Tool Market in France

PARIS, FRANCE, April 12.—The large amounts of machine-tools imported into France during the war from Great Britain, but especially from the United States, and generally ill-adapted to peace requirements, have proved a serious hindrance to the free development, since the armistice, of the French machine-tool market. Although some middlemen are still holding important stocks of such machinery, we must say that the market of machine-tools in France is now showing much improved prospects.

In 1922 France imported, with poor trade during the first half of the year, about 20,000 tons of machine-tools. In 1921 32,000 tons had been imported. Last January imports were 1462 tons, against 1251 tons in January, 1922.

French constructors have so far specialized in such machine-tools as lathes, boring machines, small planers, etc. They are also producing milling machines, but it is generally acknowledged that they cannot successfully compete with milling machines made in America. In grinding machines, gear cutting machines, etc., France remains necessarily an importing country, not because her constructors would be unable to do as well as their foreign competitors, but because they have no sufficient outlet for such machinery for producing it at competitive prices.

Although, of course, much below imports, French exports of machine-tools are, nevertheless, far from insignificant and are showing a marked progress; about 7000 tons in 1922, instead of 6000 tons in 1921; and slightly under 400 tons in January, 1923, as against 315 tons in January, 1921. There is no doubt that French constructors could export more provided

they disposed of larger bank credits for their export business and if they were more adequately represented abroad. It has been suggested that French builders should secure the services of joint representatives in foreign countries.

Some Valley Mills Show Strain of Heavy Operations

YOUNGSTOWN, April 24.—Strain of heavy operations is beginning to be felt by district iron and steel plants and a slowing-down in departments for repairs to machinery and equipment is noted.

The Mahoning Valley Steel Co., Niles, which had one mill down last week, is now operating all eight of its sheet units.

The American Sheet & Tin Plate Co. is operating 90 tin mills and eight sheet mills in this district.

Of the 17 pipe mills in this territory, 16 are active. This number has been unchanged for about nine months. Bar mills are in full operation.

Owing to scarcity of labor, puddling operations are held down to 85 per cent at the plants of the Sheet & Tube company and the A. M. Byers Co.

Austria's Steel Output in 1922

The steel production of Austria in 1922 is reported as 480,082 tons, of which 441,853 tons was open-hearth steel and 38,229 tons of other grades. For producing this steel 192,161 tons of scrap was used. The production of steel castings for 1922 is returned as 11,557 tons and the output of rolled and forged iron and steel 359,561 tons.

British Iron and Steel Market

March Exports 368,072 Tons of Iron and Steel
Including 89,356 Tons of Pig Iron—Steel
Prices Weakening

(By Cable)

LONDON, ENGLAND, April 24.

Pig iron is quiet but firm, owing to scarcity and dearness of fuel. Cleveland makers are well sold over June and show little inclination to discuss contracts for delivery further forward. Continental demand has slackened, owing to improving conditions in the Ruhr area.

Hematite is dull, but prices are well held. Foreign ore is quiet. Sellers of Bilbao Rubio ask 24½s. (\$5.67), ex-ship Tees.

Steel prices generally are unchanged, but there are signs of weakening in some quarters, owing to poor demand. Most of the works are well placed, but some of them are anxious for orders and are prepared to make concessions. Export buying is quiet and the home trade dull.

March exports of pig iron, excluding ferroalloys, were 89,356 tons, and the total of iron and steel exports amounted to 368,072 tons.

America is inquiring for merchant bars and iron and steel hoops.

The Continental position is improving. Several Belgian plants are now offering material, but buyers are not keen and no business has been reported.

In France more furnaces are being re-started through improved supplies of Ruhr fuel. The Société Metallurgique de Knutange has blown in a third furnace at Knutange. De Wendel et Cie is erecting new Martin (open-hearth) furnaces at Hayange. The Société Anonyme des Hauts-Fourneaux, Forges et Acieries de Denain et d'Anzin is shortly restarting its plant at Denain.

In Germany the general industrial position is rather unsatisfactory. All furnaces of Friedrich Krupp A. G.

Niederrheinische works are idle. The Rheinische-Hütte works is operating only two days weekly.

In Belgium the March output improved appreciably [compared with immediately preceding months].

Tin plate shows a sagging tendency on poor consumers' demand. Resale parcels have been sold on a 24¼s. (\$5.64) basis, IC, f.o.b. Makers have sold at 25s. (\$5.81) basis, IC, f.o.b., and some are prepared to go lower. The Continent has bought moderate supplies but other markets are quiet.

Galvanized sheets are quiet but steady.

There has been some revival of the Far Eastern demand for black sheets; to Japanese specifications they have sold at £21 (4.36c. per lb.) for July shipment.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.65 per £1, as follows:

Durham coke, delivered	£2 2½s.		\$9.88
Cleveland No. 1 foundry	6 10†		30.23
Cleveland No. 3 foundry	6 5		29.06
Cleveland No. 4 foundry	6 5		29.06
Cleveland No. 4 forge	6 0		27.90
Cleveland basic	6 2½		28.48
East Coast mixed	6 5	to £6 10s.	29.06 to \$30.23
Ferromanganese	18 0		83.70
Ferromanganese*	18 0		83.70
Rails, 60 lb. and up	10 0	to 10 10	46.50 to 48.83
Billets	9 10	to 10 0	44.17 to 46.50
Sheet and tin plate bars,			
Welsh	10 0		46.50
Tin plates, base box	1 4¼	to 1 5	5.64 to 5.81
			C. per Lb.
Ship plates	10 5	to 10 15	2.13 to 2.23
Boiler plates	12 10	to 13 0	2.59 to 2.70
Tees	11 0	to 11 10	2.28 to 2.39
Channels	10 5	to 10 15	2.13 to 2.23
Beams	10 0	to 10 10	2.08 to 2.18
Round bars, ½ to 3 in.	11 0	to 11 10	2.28 to 2.39
Galvanized sheets, 24 g.	19 10	to 20 0	4.05 to 4.15
Black sheets, 24 gage	14 10	to 14 15	3.01 to 3.06
Black sheets, Japanese specifications	15 5		3.16
Steel hoops	11 0	& 13 0*	2.28 & 2.70*
Cold rolled steel strip, 20 g.	23 0		4.77
Cotton ties, Indian specifications	15 0		3.11

*Export price. †Nominal.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

Merchant bars:		C. per Lb.
Belgium, May, June	£8 12½s. to £9 0s.	1.79 to 1.87
Joists (beams):		
Belgium, May, June		
July	9 0	1.87

JUDGE GARY EXPLAINS

Not in Favor of Unlimited Immigration—Quality Should Be the Test

Elbert H. Gary, chairman United States Steel Corporation, in a statement to newspaper men made orally Monday afternoon, said that his position in regard to immigration had been misunderstood by a few editorial writers who had been commenting on the remarks he had made at the annual meeting of the Steel Corporation. He wished it clearly understood that he does not favor unlimited immigration, and quoted from the address which he delivered at the meeting of the American Iron and Steel Institute last October, in which he said in part:

The restrictions upon immigration should be directed to the question of quality rather than numbers of foreigners coming to this country. Measures for limiting the number of immigrants to those who are clearly shown to be healthy, morally, politically and physically, ought to be clear, strict and enforceable; but the number allowed to come here should be equal to the necessities of our industries. The administration of the law could be under the control of a competent and impartial governmental commission or department, to be managed for the benefit of the general public and not for the protection of any special class or the exploitation of any impractical or injurious theory.

Referring to his recent Mediterranean trip, Judge Gary said:

"An important man in an important country, who lately came into power and influence, made this remark to me: 'All the people are at work.' And that represents an idea that seems manifest among the people of all the countries I visited—an apparent realization of

the fact that the time is come when work on the part of every one is essential to the recovery and the rehabilitation of economic conditions. Therein lies the hope of the world, for economic conditions are fundamental, as I have often said, to the health and happiness of every one. When every single country, as the result of industry, produces for use everything possible, in that proportion and to that extent will the country living up to the idea proceed in the direction of recovery from the ravages, the destruction and the poverty produced by war.

"One other thing: Outside of the United States, every country in the world is looking to the United States with hope and expectation and confidence for the moral and in some instances the financial support which are beneficial in the recovery from the despondency and the misery which have resulted from the conflicts of the last few years. Therefore, the responsibilities of the United States at the present time are greater than ever before. I believe this is fully and clearly realized by the President and every member of his Administration."

Judge Gary added that he had not yet made up his mind as to whether he would more fully discuss his recent trip abroad at the meeting of the American Iron and Steel Institute next month.

The Standard Foundry Co., Racine, Wis., has leased the large foundry of the J. I. Case Plow Works and has given employment to 100 additional molders. This step was taken because of the heavy demand for automobile cylinder castings and the inability of the company to supply it from its Kewaunee Street plant.

FABRICATED STEEL BUSINESS

Partly seasonal and partly the result of the building labor situation, awarding of fabricated steel contracts has slowed up. A falling off in fresh projects is noticeable, but the first part of a large railroad bridge job has swelled the tonnage total.

Following are some of the larger items of the week:

Power house work in New Jersey, 500 tons, to the Hay Foundry & Iron Works.

Parochial school, New Rochelle, N. Y., 400 tons, mentioned last week as closed, to Easton Structural Steel Co.

Apartment house, Park Avenue, New York, 600 tons, to Paterson Bridge Co.

Building for Brooklyn Borough Gas Co., 200 tons, to A. E. Norton, Inc.

Ice plant, Brooklyn, 300 tons, to A. E. Norton, Inc.

Office building, 799 Seventh Avenue, New York, 800 tons, to A. E. Norton, Inc.

Apartment house, East Forty-ninth Street, 300 tons, to Lehigh Structural Steel Co.

State and City Bank & Trust Co. building, Richmond, Va., 1400 tons, to Lehigh Structural Steel Co.

Broad Street Bank, Richmond, Va., 200 tons, to Richmond Structural Steel Co.

Bell Telephone Co. building, Altoona, Pa., 300 tons, to Shoemaker Bridge Co.

Navy Department fuel oil tanks at Portsmouth, N. H., 1400 tons, to Chicago Bridge & Iron Works.

Atlantic Coast Line, four turntables, 400 tons, to American Bridge Co.

Edison Electric Illuminating Co. of Boston, Weymouth, Mass., power station, 3500 tons, to New England Structural Co.

General Electric Co., West Everett, Mass., foundry addition, 200 tons, to New England Structural Co.

Ginn & Co., Cambridge, Mass., publishers, 600 tons, to New England Structural Co.

Hunt-Rankin, Peabody, Mass., power house, 100 tons, to New England Structural Co.

International Harvester Co. buildings C, E and P, Fort Wayne, Ind., 1400 tons, to American Bridge Co.

Western Electric Co. buildings, 15-B and 14-B, Hawthorne, Ill., 1150 tons, to American Bridge Co.

Edgewater Beach Hotel Annex, six additional stories, 700 tons, to McClintic-Marshall Co.

State of Illinois, drill hall, 122nd Field Artillery Armory, Chicago, 708 tons, to American Bridge Co.

Kansas Free Air Association, Topeka, Kan., grand stand, 320 tons, to Pratt-Thompson Construction Co.

Cutting edges for caissons for Chicago, Burlington & Quincy bridge over Platte River south of Omaha, 188 tons, to Missouri Valley Bridge & Iron Co.

Bridges at Sweet Springs and Marshall, Mo., 177 tons, to American Bridge Co.

Semet-Solvay Co., Syracuse, N. Y., coke-oven plant at Hamilton, Ont., 800 tons, to Canadian Allis-Chalmers, Ltd.

Shenstone Co., Ltd., Leyton, England, factory at Mimico, Ont., structural steel let to Canadian Allis-Chalmers, Ltd.

Metal & Thermit Corporation, Pacific Coast plant, 1400 tons, to Union Construction Co., Oakland, Cal.

Union rolling mills, Bourne-Fuller Co., Cleveland, warehouse, 200 tons, to Forest City Steel & Iron Co.

Yuster Building, Columbus, 850 tons, to the Fort Pitt Bridge Works.

United States Aluminum Co., Cleveland, factory extensions, 180 tons, to McClintic-Marshall Co.

Northern Pacific Railroad, bridge and viaduct repairs in Montana, 155 tons, to Milwaukee Bridge Co.

Sheet Metal Specialty Co., Follansbee, W. Va., building, 200 tons, to Jones & Laughlin Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Central Railroad of New Jersey, first section of bridge across Newark Bay, 22,000 tons.

Trenton Trust Co. building, Trenton, N. J., 1000 tons.

Boston & Maine Railroad Co., bridge, East Cambridge, Mass., 500 tons.

South Park Commission, Chicago, viaduct over Illinois Central tracks at Twenty-third Street, 2500 tons. General contract awarded to Strobel Steel Construction Co.

Denver & Rio Grande Western shops, Denver, Colo., 1000 tons.

Chicago & Alton, viaduct towers, Aux-Vasse, Mo., 1500 tons.

Great Northern, two 98-ft. through plate girder spans, 220 tons.

Cherry Street viaduct, Appleton, Wis., Wausau Iron Works only bidder; price, \$218,951. (Original bids rejected; second call.)

RAILROAD EQUIPMENT BUYING

Sustained Activity in Cars and Locomotives—One Urgent Purchase

Buying of cars and locomotives goes on apace and car repair business is conspicuous in the week's activity. How urgent some of the car construction work is regarded is shown by the purchase out of a warehouse of no less than 2500 tons of car material, mostly shapes and bars, by a large railroad from Joseph T. Ryerson & Son, Inc.

The Atlantic Coast Line has ordered 450 50-ton composite gondolas from the Virginia Bridge & Iron Co. This road is inquiring for 50 ballast cars.

The Chicago, Indianapolis & Louisville is inquiring for 500 50-ton gondolas.

The Louisiana Railway & Navigation Co. is in the market for 150 40-ton box cars.

The Norfolk & Western Railroad has placed an order for the repair of 700 hopper cars with the Ralston Steel Car Co.

The Bertha Coal Co., Pittsburgh, has bought 300 55-ton hopper cars from the Pressed Steel Car Co.

The Boston & Maine has placed orders for 600 cars as follows: 300 flat cars with Magor Car Corporation, 200 refrigerator cars with Merchants Dispatch Transportation Co., and 100 Hart convertible ballast cars with the American Car & Foundry Co.

The Pennsylvania Equipment Co., Norwood Station, Pa., is in the market for 6 to 10 second-hand, 8000-gal. tank cars with steel underframes.

The Illinois Central has let repairs on 300 box cars to the Midwest Engine Co., on 100 box cars to the Pullman Co., and on 150 automobile cars to the Ryan Car Co. These orders are in addition to repairs previously let, as reported in this column. The same road has placed 25 suburban coaches with the Pullman Co., and instead of awarding 6 cafe and lounge cars to that builder, as reported last week, ordered 4 parlor, 10 cafe and 5 dining cars.

The Louisville & Nashville has ordered 10 coaches from the American Car & Foundry Co.

The Chicago & Alton is inquiring for repairs on 300 coal cars and 200 gondolas.

The Spokane, Portland & Seattle is in the market for 50 flat cars.

The American Refrigerator Transit Co. has let repairs on 100 refrigerator cars to the Koppel Car Repair Co.

The Missouri Pacific has let repairs on 50 passenger cars each to the St. Louis Car Co. and the American Car & Foundry Co.

The Sand Springs Railway let 6 tank cars to the General American Tank Car Corporation.

The Elgin, Joliet & Eastern has placed 80 underframes with the Illinois Car & Equipment Co.

The Atlantic Coast Line has ordered 5 dining cars from the Pullman Co.

The Delaware, Lackawanna & Western placed 10 milk cars with the Standard Steel Car Co.

The Arms Yager Horse Car Co. has ordered 50 horse cars from the Pullman Co.

The Boston & Maine placed 100 ballast cars with the American Car & Foundry Co.

The Western Maryland is inquiring for 20 consolidation type engines.

The American Locomotive Co. has booked the following orders: Two switch and one freight locomotives from the Tennessee Coal, Iron & Railroad Co., 40 Mikado type locomotives from the Lehigh Valley, 30 Mikado type and 20 switch engines from the Wabash, and 5 locomotives from the Buffalo Creek Railroad.

Domestic sales of oak leather belting in March, as reported by the Leather Belting Exchange, representing about 60 per cent of the total product, amounted to 520,379 lb., valued at \$972,069, or an average of \$1.87 per lb. This compares with February sales amounting to 441,863 lb. valued at \$821,867, or an average of \$1.86 per lb. Sales in March of last year amounted to 373,610 lb., valued at \$625,424, or an average of \$1.67 per lb.

W. M. White, chief engineer, of the Allis-Chalmers Co., addressed a combined meeting of the Cincinnati Engineers' Club and the Cincinnati section of the A. I. E. E. at a dinner meeting held in the Chamber of Commerce, April 19. Mr. White described the recent developments in hydraulic turbine design and also described a visit to a water power development in Formosa, which was illustrated by colored lantern slides.

Iron and Steel Markets

PRICE STABILIZING

Advances on Contract Steel, But Premiums Are Reduced

Efforts to Hold Prices of Railroad Steel in Bounds—Consumption Heavy but New Buying Less

High production, continued pressure for deliveries and sustained consumption of steel in all manufacturing lines are reported in every district. There is agreement, also, in saying that buying has diminished because many users of steel have their supply bought for three to six months ahead and because the leading mills, especially those rolling the heavier products, are sold up well into the third quarter.

Certain price advances just made by the Steel Corporation do not mean that demand is outrunning supply. Some of these new prices are still below the so-called premium prices independent producers have been getting for early delivery material.

In advancing standard and oil country pipe \$4 a ton, as of April 19, the Steel Corporation was followed by various independent mills. In putting wire products up \$2 a ton, or to 2.75c. for plain wire and \$3 a keg for nails, the corporation followed the independents. It has put bars to 2.40c. and plates and shapes to 2.50c., Pittsburgh, and has advanced these products to 2.50c. and 2.60c. respectively at Chicago—an advance of \$2 a ton.

One more advance is likely to come this week when the Steel Corporation will name sheet and tin plate prices for the second half of the year. The new basis for tin plate may be \$5.50 per box, whereas \$6 has been the market lately for prompt delivery.

Three months of heavy production of steel and now a greater willingness of steel companies to accept business have taken the fever out of the market and checked the scramble to get hold of steel by paying premiums.

At the same time the extraordinary consumption sets new precedents. In one case a railroad wanting quick car material bought 2500 tons from a jobber—probably a record purchase of the kind from a warehouse.

Railroads are making every effort to get full equipment for fall traffic. The week's contracts cover 98 locomotives, 2060 cars, including 500 for the Steel Corporation's coke subsidiary, and repairs on 1450 cars.

There is evidence of stabilizing effort by steel companies to prevent inflation of railroad costs. Recent sales of rails at \$43 for delivery in late fall have been taken as indication that the rail price will not go higher, even though low in relation to other products.

Bridge and building contracting remained at about two-thirds the rate of March. Fresh in-

quiries totaled 29,000 tons, but 22,000 tons represents the first part of a Central Railroad of New Jersey bridge, likely to take all told more than 50,000 tons.

Two or three structural mills are now able to take business for delivery in July, indicating an easier situation. Better delivery promises can be made by certain plate mills also. Generally new structural projects are fewer.

Semi-finished steel for early delivery is still scarce, but not quite so hard to get, as indicated by recent sales of billets at \$45 and of sheet bars at \$46. Second quarter allotments of semi-finished steel to regular customers have been made in some cases at \$40 to \$42.50.

The sheet mills are still well supplied with orders, heavy automobile demand, the peak of which is just ahead, having caused a variety of premium prices.

A few implement makers have been sounding the steel bar market for fall deliveries that will go into next season's output.

Pig iron prices are showing a softening tendency, particularly in the Buffalo and Cincinnati districts, and some reselling has been done in Philadelphia. Sales are few and for small tonnages. Most furnaces, however, are supplied with orders and are satisfied with the present outlook.

The embargo on coke at Philadelphia has not been removed, but shipments can be made by obtaining permits and the movement to foreign countries is being conducted in a more orderly way. Exports are for the most part to France on contracts made some time ago.

Lake Superior ore producers are disappointed by the slight reduction on ore freight rates from the old ranges to upper lake ports, ordered by the Interstate Commerce Commission, and further efforts for relief may be made.

While current export business is meager, consumption in the Orient and other markets is on a scale promising a new buying movement in the near future. Cuban sugar interests have just added 2,200 tons of rails to recent purchases here.

Pittsburgh

Price Advances and Adjustments—Steel Corporation Policy Conservative

PITTSBURGH, April 24.—The recent price developments in the steel market are comparable to a tree-pruning operation. Higher branches are being trimmed and the lower boughs propped. Better deliveries incident to the very heavy production since the first of the year, to say nothing of an increased disposition on the part of the larger producing interests to accept business, have produced a calmer attitude among buyers and still further reduced the amount of so-called premium business.

On the other hand, there has been a distinct stiffening in the minimum market prices, this movement representing for the most part an adjustment to present day costs. It is significant, however, that the new minimum quotations represent reasonably early and definite delivery, where former inside quotations

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 24, 1923	Apr. 17, 1923	Mar. 27, 1923	Apr. 25, 1922
No. 2X, Philadelphia	\$32.76	\$32.76	\$33.14	\$25.40
No. 2, Valley furnace	31.00	31.00	31.00	23.00
No. 2, Southern, Cin'ti	31.05	31.05	31.05	21.00
No. 2, Birmingham, Ala.	27.00	27.00	27.00	16.50
No. 2 foundry, Chicago*	32.00	32.00	32.00	21.00
Basic, del'd, eastern Pa.	30.25	30.25	30.25	21.50
Basic, Valley furnace	31.00	31.00	31.00	23.00
Valley Bessemer, del. P'gh	32.77	32.77	32.77	23.96
Malleable, Chicago*	32.00	32.00	32.00	21.00
Malleable, Valley	31.00	31.00	31.00	23.00
Gray forge, Pittsburgh	32.27	32.27	32.27	24.46
L. S. charcoal, Chicago	36.65	36.65	36.15	28.00
Ferromanganese, furnace	125.00	125.00	120.00	65.00

Rails, Billets, Etc., Per Gross Ton:	Apr. 24, 1923	Apr. 17, 1923	Mar. 27, 1923	Apr. 25, 1922
O.-h. rails, heavy, at mill	\$43.00	\$43.00	\$43.00	\$40.00
Bess. billets, Pittsburgh	45.00	45.00	45.00	29.50
O.-h. billets, Pittsburgh	45.00	45.00	45.00	29.50
O.-h. sheet bars, P'gh	46.00	47.50	45.00	31.00
Forging billets, base, P'gh	55.00	52.00	52.00	34.50
O.-h. billets, Phila	50.17	50.17	50.17	35.24
Wire rods, Pittsburgh	51.00	50.00	50.00	38.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.50	2.35	2.35	1.50
Light rails at mill	2.25	2.25	2.25	1.50

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.825	2.825	2.825	1.86
Iron bars, Chicago	2.60	2.60	2.60	1.65
Steel bars, Pittsburgh	2.50	2.50	2.50	1.50
Steel bars, Chicago	2.84	2.84	2.84	1.60
Steel bars, New York	2.84	2.84	2.84	1.88
Tank plates, Pittsburgh	2.50	2.50	2.50	1.50
Tank plates, Chicago	2.84	2.84	2.84	1.60
Tank plates, New York	2.84	2.84	2.84	1.88
Beams, Pittsburgh	2.50	2.50	2.50	1.50
Beams, Chicago	2.84	2.84	2.84	1.60
Beams, New York	2.84	2.84	2.84	1.88
Steel hoops, Pittsburgh	3.30	3.30	3.30	2.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Apr. 24, 1923	Apr. 17, 1923	Mar. 27, 1923	Apr. 25, 1922
Sheets, black, No. 28, P'gh	4.00	4.00	3.85	3.15
Sheets, galv., No. 28, P'gh	5.25	5.25	5.25	4.15
Sheets, blue an't'd, 9 & 10	3.25	3.25	3.25	2.40
Wire nails, Pittsburgh	3.00	2.90	2.90	2.40
Plain wire, Pittsburgh	2.75	2.65	2.65	2.25
Barbed wire, galv., P'gh	3.80	3.70	3.70	3.05
Tin plate, 100-lb. box, P'gh	\$6.00	\$6.00	\$5.50	\$4.75

Old Material, Per Gross Ton:	Apr. 24, 1923	Apr. 17, 1923	Mar. 27, 1923	Apr. 25, 1922
Carwheels, Chicago	\$26.50	\$27.50	\$28.50	\$19.50
Carwheels, Philadelphia	26.00	26.00	27.00	16.00
Heavy steel scrap, P'gh	25.00	25.50	27.00	17.00
Heavy steel scrap, Phila	23.00	23.00	26.00	14.50
Heavy steel scrap, Ch'go	22.00	22.00	23.50	15.00
No. 1 cast, Pittsburgh	27.00	28.00	28.00	17.50
No. 1 cast, Philadelphia	25.00	26.00	29.00	17.50
No. 1 cast, Ch'go (net ton)	25.00	25.50	26.50	15.50
No. 1 RR. wrot. Phila	26.00	28.00	28.00	16.00
No. 1 RR. wrot. Ch'go (net)	20.50	20.50	21.00	13.00

Coke, Connellsville, Per Net Ton at Oven:	Apr. 24, 1923	Apr. 17, 1923	Mar. 27, 1923	Apr. 25, 1922
Furnace coke, prompt	\$6.00	\$6.00	\$7.25	\$5.50
Foundry coke, prompt	7.00	7.00	8.50	6.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	17.00	17.25	17.37½	13.00
Electrolytic copper, refinery	16.75	16.75	17.12½	12.75
Zinc, St. Louis	7.80	7.35	7.80	5.00
Zinc, New York	7.45	7.70	8.15	5.35
Lead, St. Louis	7.90	8.15	8.20	5.20
Lead, New York	8.00	8.25	8.50	5.40
Tin (Straits), New York	45.62½	45.30	47.37½	31.12½
Antimony (Asiatic), N. Y.	8.00	8.25	8.75	5.00

Composite Price, April 24, 1923, Finished Steel, 2.824c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	April 17, 1923, 2.810c. March 27, 1923, 2.789c. April 25, 1922, 2.084c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, April 24, 1923, Pig Iron, \$30.79 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	April 17, 1923, \$30.79 March 27, 1923, 30.86 April 25, 1922, 21.98 10-year pre-war average, 15.72
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for the most part were nominal and carried on specified shipping dates. An advance in pipe, which amounts to \$4 a ton in the sizes representing the larger part of the production, but considerably more in those sizes and kinds where costs are high; an increase of \$2 per ton in the products of the American Steel & Wire Co., a rise of \$1 in plates, shapes and bars and advances which will be announced tomorrow or Thursday in sheet and tin plate by the American Sheet & Tin Plate Co., may be considered merely as adjustments and a part of a movement now fairly well defined toward stabilization of the market at what are considered fair prices. Present quotations of the American Sheet & Tin Plate Co. on sheets are 3.50c., base, for black; 4.60c., base, for galvanized; 2.65c. for blue annealed, and 5c., base, (No. 22 gage) for automobile body stock. On sales for early delivery, independent mills lately have been getting as high as 4.25c. for black; 5.75c. for galvanized; and 3.35c. for blue annealed, but it is not at all likely that the new Steel Corporation prices will be in the least influenced by these figures. It can also be safely stated that the corporation will name considerably less than the present spot price of tin plate. While the shortage of semi-finished steel is rather pronounced, it evidently is less acute than it was recently, in view of

the fact that there have been definite offers of billets at \$45 for early shipment, while we note some business in sheet bars for shipment in 30 days at \$46, which measures a drop of \$1.50 a ton from the price on the last previous early delivery transaction.

We note no material let down in the production of steel in this and nearby districts, and present indications are that the production of this month will be only slightly less than that for March. There has been no recession in blast furnace activities, there still being only 13 idle stacks out of the 138 in this and nearby districts. One Valley furnace has gone down for repairs, but another has started up.

Intense dullness still prevails in the pig iron market, but with the merchant producers well supplied with business, there is no pressure to sell and prices are unchanged. Further recessions are noted in old material prices and the fuel market still is depressed by the fact that supplies exceed the demand.

Pig Iron.—Interest in the market on the part of melters still is negligible. They do not seem to expect higher prices for third quarter tonnages and show a disposition to use up such iron as they have on hand or coming to them before starting negotiations for future supplies. Two or three merchant producers are

piling iron, but stocks have not reached such a size that they threaten the structure of prices, especially as the producers who are piling are financially able to carry it. The largest sale of the week was 1000 tons of malleable iron at \$31, Valley furnace, delivery over the remainder of present quarter and into the third quarter. Offers of basic iron at \$30 by middlemen have not induced purchases and a recent inquiry for 1000 tons of Bessemer has been withdrawn, one explanation being that there was a good deal of anxiety on the part of producers to sell, this inducing the expectation of a modification of price later. The monthly meeting of the American Pig Iron Association was held here today. It is stated that the dominant note of the meeting was one of optimism, since reports showed that March bookings of merchant furnace interests were about 1,000,000 tons and that a good many melters were nearing the end of their contracts. Present dullness was regarded as merely a lull and likely to be followed by a period of great activity as the third quarter approaches.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.77 per gross ton:

Basic	\$31.00
Bessemer	31.00
Gray forge	30.50
No. 2 foundry	31.00
No. 3 foundry	30.50
Malleable	31.00
Low phosphorus, copper free	36.00

Ferroalloys.—Ferromanganese prices still show an upward tendency, with \$120 seaboard or furnace, or \$124.79, delivered Pittsburgh now the minimum on both domestic and British material. A week ago, domestic producers were taking business for third quarter at \$115, provided the buyer provided some fourth quarter business; this week, \$120 has been obtained on fourth quarter tonnages. Not much demand is noted for nearby deliveries, since most consumers are well covered against their requirements from now until July 1, and have a need for only occasional cars. As high as \$130 has been named against early deliveries, but it is admitted that the orders were not forthcoming at that figure. No big inquiries are current here for spiegel-eisen, as consumers have contracted well ahead and there has been falling down in deliveries against such orders. The leading commercial producer is sold out almost to the end of the year. On 50 per cent ferro-silicon, as high as \$100 delivered is mentioned, but evidence of sales at higher than \$95 is lacking. Prices are given on page 1217.

Iron and Steel Bars.—The Steel Corporation and the leading independents in the past week went to a base of 2.40c., Pittsburgh, and while still unable to make early deliveries they are less adverse to taking new business than recently. We note sales of small tonnages as high as 3c. base, but such sales are much less frequent than they were recently. Large producers are not charging over 2.50c. for such early tonnages, as they can take for regular customers and for late July and early August delivery the price is 2.40c. There has been no change in iron bars.

We quote steel bars rolled from billets at 2.40c. to 2.75c.; rail steel reinforcing bars, 2.35c. to 2.50c.; refined iron bars, 3.25c. in carloads, f.o.b. mill Pittsburgh.

Wire Products.—The leading producer withdrew all prices on April 18, and followed this up by adopting the schedules of leading independents on such business as it may find itself in a position to accept. This is equivalent to an advance of \$2 per ton and applies to all finished products except woven wire fence, which remains at 67½ per cent off list to jobbers and 65 per cent off to retail distributors. Some of the independents still are quoting fence one point less than the leading producer, but have nothing to sell for the present and probably will meet the Steel Corporation discount when they reenter the market. Manufacturers representing a large part of the country's capacity now are quoting the same prices and the market now may be regarded as fairly established at \$3 base, per keg for bright nails, \$2.75, base, per 100 lb. for plain wire, \$3.35 per 100 lb. for galvanized wire and \$3.80 per 100 lb. for

galvanized barbed wire. These prices apply only on such tonnages as the mills can fit into present schedules for regular customers, as all of them are heavily committed and are not making real progress toward cutting down obligations owing to continued shortages of labor, notably of common labor. For very prompt delivery, more than the quoted prices is being obtained for nails. Prices are given on page 1216.

Structural Material.—The supply situation is a trifle easier, since at least two independent mills are now in shape to take business for delivery in July, and both are quoting 2.50c., Pittsburgh. The Steel Corporation price also is 2.50c., Pittsburgh. Most of the structural jobs now coming out in this territory involve small tonnages. Plain material prices are given on page 1216.

Semi-Finished Steel.—It has been definitely determined that the second quarter contract prices of billets, sheet bars and slabs on such tonnages as makers are allotting regular customers range from \$40 to \$42.50, Pittsburgh and Youngstown. Tonnages for early delivery still are scarce, but not quite so hard to obtain as recently. Reasonably early delivery now is promised on 4-in. billets at \$45, and we note a sale of a round tonnage of sheet bars for early shipment at \$46. Higher prices still are quoted for early delivery, but demands of an urgent character are fewer and with premium business in furnished products lighter, buyers no longer are "climbing" for supplies. Forging billets are hard to obtain below \$55, and one mill here is asking \$58. Skelp is generally held at 2.50c. in line with plates. One lot of boiler tube skelp is under negotiation at 2.65c., but the highest price done on any pipe skelp here has been 2.35c. If the American Steel & Wire Co. finds itself able to take on any rod business, the price is to be \$51 for No. 5 to ¼-in. and \$53.50 for coarser than ¼ in., these prices representing an advance of \$2 a ton. Independent makers have sold as high as \$55 for the base sizes, but are not believed to be exacting the extra of \$2.50 for coarser than ¼-in. rods. Prices are given on page 1217.

Steel Rails.—Interest of Eastern railroads in their rail requirements for the last half of this year is small. Eastern rail making capacity is so large in respect to requirements that Eastern lines are relieved of the anxiety as to supplies to a far greater extent than Western roads, since Western capacity is none too large for requirements. It is doubtful whether Eastern mills will complete deliveries on orders taken last fall at \$40, by July 1. Light rails are quiet and while some makers are talking 2.35c. base, demand is hardly strong enough to sustain a higher price than 2.25c. base.

We quote 25 to 45-lb. sections, rolled from new steel, 2.25c. base; rolled from old rails, 2.25c. base; standard rails, \$43 per gross ton mill for Bessemer and open-hearth sections.

Tubular Goods.—The expected advance in steel pipe prices was announced by the National Tube Co. on April 19, and since has been followed by independent producers, with cards dated either that day or April 20. The advance amounts to \$4 a ton on those sizes of standard and oil country pipe constituting the great bulk of the production, but runs greater in the sizes over 9 in. and in large outside diameter pipe and water well casing. It is evident in the framing of the new cards that considerable attention was given to costs of individual sizes and kinds of pipe, since prices in a number of instances reflect an effort to establish prices more compatible with costs than former lists. The advance is not a horizontal one, as most previous ones have been and future changes are likely to be, now that schedules believed to set prices based on individual costs have been established. The new line pipe card reflects an increase of only \$3 a ton in the sizes 8 in. and smaller, but a reduction in the supplementary discounts makes the advance at least \$4 over the old card. Coincident with the advance in steel pipe was one in steel tubes, amounting to \$6 to \$14 a ton in lapwelded tubes, averaging about \$8 per ton in seamless boiler tubes, \$20 a ton in mechanical tubing, which is based on \$1000 a ton and discounts of which were lowered two points, and 1c. to 2c. per ft. on locomotive and

superheater tubes. There has been no further change in charcoal iron boiler tubes, which advanced \$12 a ton recently, and makers of wrought iron pipe advise that present discounts, adopted last January, will hold until such time as costs make necessary a change. General conditions show little change. All producers have heavy order books. In the effort to provide all customers with supplies, distribution of production is entirely proportional and there are a good many inquiries in the market from buyers unable to get all the tonnage they require from regular supply sources. There is an inquiry for Western delivery of 80 miles of 10-in., 65 miles of 6-in. and a smaller mileage of 8-in. line pipe. New discounts are given on page 1216.

Bolts, Nuts and Rivets.—Published quotations are not yet the basis of any considerable amounts of business in bolts and nuts, because buyers were so generally allowed to enter contracts for this quarter at the old prices. Specifications against contracts are good, but brand new demands are light. Business in rivets is holding up well and prices set up for the present quarter are reported to be finding close observance. Prices and discounts are given on page 1216.

Track Fastenings.—There has been no change in prices since a week ago on spikes, but on track bolts, \$4.25, base, per 100 lb. now is minimum on large ones and makers here are generally quoting small ones \$5.50. Specifications against old orders are good and there is a fair amount of supplementary buying of small lots. Prices are given on page 1216.

Cold-Finished Steel Bars and Shafting.—The market still is quotable at 3c. to 3.10c. base, Pittsburgh, for carload lots, but complaint is common among producers that the present differential between prices of hot-rolled and cold-finished bars is not sufficient, based on today's conversion costs, and an effort is likely soon to correct this condition through an advance in the latter. If the proposed extra of \$3 a ton for hot-rolled bars of screw stock quality is generally adopted and applied, it forms the basis of an advance in cold-finished screw stock bars. Such a change cannot well be applied during the present quarter, or until the makers of hot-rolled bars are out of their present obligations. Ground shafting remains at 3.40c. base, f.o.b. mill, for carload lots.

Plates.—Large producing interests now are all on a base of 2.50c., Pittsburgh, and while third quarter is the best delivery of most of them at that price, there is some ¼ and 3/16 stock available at that figure for fairly quick shipments. Heavy plates are not yet very freely offered for shipment before August 1. Premiums for delivery are still being paid, but such cases are not as numerous as they have been. The full range of prices is given on page 1216.

Sheets.—The market has quieted down somewhat pending the announcement later this week of the third quarter or last half prices of the leading interest. No intimation has been dropped as to what the prices will be other than that increased costs over the past month and one-half will be recognized. This company has materially reduced its obligations and it may be stated that it will have considerably more tonnage for third quarter delivery than it previously had figured. Independent manufacturers are well booked up for the next two months and are not yet ready to enter third quarter business. As buyers also are cautious about buying beyond the present quarter, the lighter volume of business is easily understood. Prices are given on page 1216.

Tin Plate.—Interest centers in the announcement for third quarter or last half prices to be made later this week by the American Sheet & Tin Plate Co. Business has been rather quiet lately, due to the well-covered condition of consumers and the fact that makers have little or nothing to sell for delivery during the remainder of the present quarter. On the most recent business for early delivery, production plate has commanded \$6 per base box and the idea of most independents for third quarter business ranges from \$5.75 to \$6.

The Steel Corporation price is not expected to be as high as the lower figure.

Hot-Rolled Flats.—There is no change in prices, the market still being quotable from 3.30c. to 3.50c., base, Pittsburgh, for the easily rolled gages and widths. On light narrow hoops, 3.75c. base is a going quotation, while there are occasional instances of less than 3.30c. being done by mills which have run down on orders for wide material. Explanation for the early opening of the season on cotton ties is found in a desire of the mills to get orders in promptly and the ties rolled and shipped that they may not interfere with production of other merchant mill lines. No foreign competition on ties is expected this year, as the lowest price named from abroad is equivalent to \$1.90, Atlantic seaboard. Prices are given on page 1216.

Cold-Rolled Strips.—The quotable range of prices is the same as that of a week ago, or from 5.25c. to 5.50c. base, Pittsburgh. A number of mills are holding firmly to the higher figure, but 5.25c. still can be done. Some makers have had a suspension order from the Ford Motor Co., but it is understood that this applies only to certain sizes and is based on the fact that the Ford Motor Co. has been getting supplies of steel rather freely and its stocks have gotten out of balance.

Coke and Coal.—Prices are holding at about last week's levels, but strength still is absent. Production of coke still is running considerably ahead of contract requirements and the disposition of the surplus is possible only at low prices. We continue to quote the market on standard Connellsville furnace coke for spot delivery at \$6 to \$6.25 per net ton at oven with some business in loaded cars which have to be moved taking a price as low as \$5.50. Standard 72-hr. coke is quotable from \$7 to \$7.50 per net ton at oven, with occasional sales as low as \$6.50 for "distress" tonnages. The coal market is dull and weak at \$1.75 to \$2.25 per net ton at mines for mine run steam coal for prompt delivery and from \$2.50 to \$2.75 for mine run gas and coking coal, for spot or prompt shipment.

Old Material.—The market has developed further weakness since a week ago, with the downward tendency embracing a larger number of grades. Heavy melting steel has eased off 50c. a ton further on sales of local melters. This grade is not now quotable above \$25 on sales in this territory and, as it has been freely offered at that figure in the past few days, it is probable the next sale will be even lower. The highest bid of any of the mills in this district now is \$23.50. Last week's prices no longer can be obtained on cast scrap and turnings are weaker, as are also the specialties, despite the high prices which are reported to have been paid on recent railroad lists. One of the Steel Corporation's subsidiaries in the past week is understood to have closed for more than 20,000 tons of railroad specialties at \$28.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$25.00
No. 1 cast, cupola size.....	\$27.50 to 28.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.....	27.00 to 27.50
Compressed sheet steel.....	24.50 to 25.00
Bundled sheet sides and ends....	22.50 to 23.00
Railroad knuckles and couplers...	27.50 to 28.00
Railroad coil and leaf springs...	27.50 to 28.00
Low phosphorus standard bloom and billet ends.....	31.50 to 32.00
Low phosphorus, plates and other grades.....	28.00 to 28.50
Railroad malleable.....	25.50 to 26.00
Steel car axles.....	28.50 to 29.00
Cast iron wheels.....	27.00 to 27.50
Rolled steel wheels.....	27.50 to 28.00
Machine shop turnings.....	20.00 to 20.50
Heavy steel axle turnings.....	22.00 to 22.50
Short shoveling turnings.....	21.00 to 21.50
Cast iron borings.....	21.50 to 22.00
Heavy breakable cast.....	24.50 to 25.00
Stove plate.....	20.50 to 21.00
Sheet bar crop ends.....	29.00 to 30.00
No. 1 railroad wrought.....	20.00 to 20.50

Chicago

Buying Slackens, but Pressure for Deliveries Is Very Strong

CHICAGO, April 24.—The leading local mill has advanced plates and shapes to 2.50c., Chicago, bars to 2.40c., and bands to 3.50c. These prices cover material for indefinite delivery only, and are more or less nominal because the company is not pressing for new business, as its present commitments will carry it well toward the end of the year. The National Tube Co. has raised prices on all classes of steel pipe \$4 a ton, with adjustments on the larger sizes amounting to \$6 to \$8. Local warehouse prices on boiler tubes and wire products have been marked up. Notwithstanding these changes, mill prices on steel for specified shipment, with the exception of those on sheets, appear to be no higher than a week ago.

Buying has slackened perceptibly, although the market situation remains fundamentally strong. Pressure for deliveries is undiminished and consumption is heavy, increasing with every gain in mill output. In fact, it is probable that even more steel would be consumed if it could be obtained, labor supply permitting. The market has been singularly free from speculative buying, although the occasional reselling of small lots of material has been reported. The decline in buying is not regarded as a cause for alarm, as it appears to be ascribable largely to the remote deliveries now available. Railroad car builders are committed through the remainder of the year, while large building projects are being postponed because of the impossibility of getting the structures under cover before severe weather sets in again. It is also probable that high labor costs are retarding new building, but the surprising fact, after all, is the large amount of new construction work which continues to be undertaken in spite of these factors. New railroad orders for rails and track fastenings are light because of the heavy buying done earlier. The efforts of the carriers now are directed toward getting deliveries rather than putting new tonnage on mill books, particularly when it seems doubtful whether it could be rolled before the close of the year.

Local mill output has registered a gain for the first time in weeks. The Illinois Steel Co. has added one blast furnace each at South Works and Joliet, so that its active list now includes 11 stacks at Gary, 10 at South Works and three at Joliet, or a total of 24 out of 27 steel works furnaces. It also continues to operate one merchant blast furnace at Milwaukee. Its steel production has been increased to 91 per cent of ingot capacity, the highest rate attained in several years. The Inland Steel Co. continues to operate at from 75 to 80 per cent of ingot capacity with all three of its blast furnaces going.

Ferroalloys.—There continues to be some demand for ferromanganese and prices for spot material appear to have advanced to \$130 seaboard, while the minimum for third quarter shipment is \$120. Spiegeleisen is still scarce for early delivery, but can be bought for second half shipment at \$40, Eastern furnace.

We quote 80 per cent ferromanganese, \$127.56 for deferred delivery and \$137.56 for early shipment; 50 per cent ferrosilicon, \$95, delivered; spiegeleisen, 18 to 22 per cent, \$53.58 for early delivery and \$48.58 for second half, delivered.

Pig Iron.—The market is exceedingly quiet, but prices remain unchanged and firm. Producers are not alarmed, because they are well booked ahead and they see in heavy current consumption a sure promise of a revival in buying. Pig iron shipments are heavy and shipments of foundry coke are the largest in history. Notwithstanding the heavy purchases earlier in the year, there has been no speculative buying and melters' stocks on yards are not large. In fact, users generally have been cautious, possibly over-cautious. There is no doubt that the weakness of the Connellsville coke market accounts in large measure for the present cessation of activity in pig iron. It cannot be said that buyers generally expect further sharp recessions in coke, but they are deferring their pig iron purchases until the coke market stabilizes. It is pointed out that this waiting policy may be carried to the extreme and that

if melters are forced to re-enter the market simultaneously upon the exhaustion of their present supplies the effect will be to force prices upward again. A local company is inquiring for 300 to 500 tons of 14 to 16 per cent ferrosilicon for second quarter shipment. This is the only inquiry in the market of any size.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	\$36.65
Northern coke, No. 1, sil. 2.25 to 2.75	\$33.00 to 34.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	32.00 to 33.00
Malleable, not over 2.25 sil.	32.00 to 33.00
Basic	32.00 to 33.00
High phosphorus	32.00 to 33.00
Southern No. 2	33.01
Low phos., sil. 1 to 2 per cent copper free	36.00 to 37.00
Silvery, sil. 8 per cent	44.29

Rails and Track Supplies.—A Western railroad has divided an order for 10,000 tons of standard section rails between two Western mills. A number of small orders, mostly from frog and switch manufacturers and totaling 11,000 tons, were placed with a Chicago producer. Track supplies and light rails are quiet.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills. Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.80c. base and track bolts, 4.80c. base.

Plates.—The leading local maker has advanced plates \$2 a ton to 2.60c. base, Chicago, for delivery at mill's convenience. This interest is not pressing for new business, as its present bookings will probably carry it into fourth quarter or farther, depending on production. The Inland Steel Co. remains out of the market and does not expect to open its books for third quarter until early in June. From present indications it would appear that some of its second quarter tonnage will have to be carried over into third quarter. So far as specific delivery is concerned, material is available from mills east of here at about the same price as heretofore. Demand for plates remains less active, but pressure for deliveries is unrelaxed and consumption is as heavy as mill output will permit. New buying of railroad cars and oil storage tanks has slackened, as available deliveries from builders have grown more remote. The only fresh tank project of importance is one involving 5000 tons, for which the Roxana Petroleum Co. is inquiring.

The mill quotation is 2.60c., Chicago, for indefinite delivery and 2.84c. to 3.19c. delivered Chicago for specific shipment. Jobbers quote 3.30c. for plates out of stock.

Structural Material.—An advance of \$2 a ton by the leading local mill has brought the price of plain material for indefinite shipment up to 2.60c., Chicago. The Inland Steel Co. remains out of the market, while material for specified shipment can be obtained from sources east of here at about the same prices as heretofore. Structural awards during the week aggregate 5500 tons, and while this total is below the average during March or February, it indicates that building activity is slow to lose its momentum. New projects which are now coming into the market, however, are largely under 1000 tons each, indicating general recognition of the fact that the existing delivery situation would hardly permit a large job to get under roof before the cold weather sets in again.

The mill quotation on plain material is 2.60c., Chicago, for indefinite delivery. We quote 2.84c. to 3.19c. delivered Chicago for plain material for specific shipment. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Local prices on soft steel bars for indefinite delivery have advanced \$2 a ton to 2.50c., Chicago. Material for special shipment is available from sources east of here at approximately the same levels as heretofore. Generally speaking, demand is less active, although warehouses are short of bars as well as most other finished products and would place more business with the mills if they could get deliveries. Notwithstanding widespread confidence in the soundness of basic conditions underlying present industrial activity,

it is apparent that consumers are growing more cautious and are protecting themselves from any possible repetition of what happened in 1920, remote as that possibility seems. This caution is reflected in a disinclination to buy further ahead than they are now covered and a sustained effort to keep inventories down. In a few instances, users are reported to have resold material bought at lower prices, preferring to make a profit now and take their chances on prices later on rather than hold the steel. It is doubtful whether there has been much reselling, however, inasmuch as most consumers have less steel on hand than they require for their current operations. There have been no changes in the bar iron or hard steel bar situations.

Mill prices are: Mild steel bars, 2.50c., Chicago, for indefinite delivery and 2.34c. to 3.19c. for specific delivery; common bar iron, 2.60c. to 2.75c., Chicago; rail steel, 2.30c. to 2.40c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.30c. for rounds and 4.80c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—The leading interest has withdrawn from the market, apparently preparatory to further price advances. Production is not so good as in March, and the efforts of mills are still directed toward the reduction of their heavy forward obligations.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, \$3.95 per 100 lb.; cement coated nails, \$3.40 per keg.

Cast Iron Pipe.—Awards have been few, although considerable tonnage comes up for bids this week. Sturgis, Mich., has placed 100 tons with the National Cast Iron Pipe Co. Prices remain about the same, with 4- and 6-in. commanding premiums. Although pipe shops are comfortably booked, they can still offer attractive deliveries except on some of the smaller sizes.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$61.20 to \$62.20; 6-in. and above, \$57.20 to \$58.20; class A and gas pipe, \$5 extra.

Bolts and Nuts.—Buying is as heavy as could be expected at this stage of the second quarter, although not exceedingly active. Western sellers continue to adhere to the discounts of March 1.

Jobbers quote structural rivets, 4c.; boiler rivets, 4.10c.; machine bolts up to $\frac{3}{4}$ x 4 in., 45 and 5 per cent off; larger sizes, 45 and 5 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 40 and 5 off; larger sizes, 40 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$2.50 off; blank nuts, \$2.50 off; coach or lag screws, gimlet points, square heads, 50 and 5 per cent off.

Sheets.—With the coming of warmer weather, sheet mill labor has shown a tendency to lay off, and the mills fear that their operations will be crippled because of this voluntary absenteeism throughout the next four or five months. It is because of this prospect of reduced production rather than active current demand that the mills have become even firmer in their ideas as to prices. Local producers remain out of the market.

Mill quotations are 4c. to 4.50c. for No. 28 black, 3c. to 3.50c. for No. 10 blue annealed and 5c. to 5.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb. Jobbers quote, f.o.b. Chicago, 4.15c. for blue annealed, 5c. for black and 6.10c. for galvanized.

Reinforcing Bars.—New projects involving concrete bars continue to make their appearance, indicating sustained activity in the building industry. The principal limitation on construction work at present is the scarcity of steel. Deliveries from the mills are showing little, if any, improvement, and bar dealers, therefore, continue to follow a cautious policy in adding to their present commitments.

Lettings include:

Commonwealth Edison Co., Chicago, crib-house at Crawford Street station, 210 tons to Concrete Steel Co.

Illinois State highway work, 150 tons to Concrete Steel Co.

Irrigation project, Shinook, Mont., 100 tons to Kalman Steel Co.

Elgin, Joliet & Eastern round house, Joliet, Ill., 114 tons to Kalman Steel Co.

Baltimore & Ohio elevator, Locust Point, Md., 2300 tons to Bethlehem Steel Co.

Pending business includes:

Valley City Milling Co., grain elevator, Grand Rapids, Mich., 900 tons.

Chicago Burlington & Quincy viaduct at Van Buren Street, Chicago, 450 tons.

Fair Store addition, Chicago, 400 tons, bids on general contract to be taken May 1.

Hotel LaSalle garage, Chicago, 200 tons.

St. Francis Hospital, Evanston, Ill., 300 tons.

Elks Club building, Milwaukee, Wis., 250 tons.

Ralsar Apartments, Detroit, 150 tons to McRae Steel Co.

Sewage Treatment Plant, Urbana, Ill., 355 tons to Hugh J. Baker.

Warehouse Prices.—Jobbers have advanced wire and wire nails 15c. per 100 lb. and cement coated nails 15c. a keg. The new quotations are shown under wire products. They have also raised boiler tubes in conformity with recent mill advances. Four-inch lap welded, charcoal and seamless tubes have each gone up about 2c. a foot, lap welded to 41½c. a foot, charcoal to 69c. and seamless to 46c.

Coke.—The leading producer of by-product foundry coke in this district has put in the last block of its local ovens and for some time has been operating its Milwaukee batteries at capacity. Its shipments to foundries are the largest on record. Local by-product foundry remains unchanged at \$15, delivered Chicago switching district. Prices on beehive foundry range all the way from \$7.50 to \$8.25, f.o.b. Connellsville.

Old Material.—Except for scattered purchases, there continues to be little buying by consumers, and in the meantime the available supply of scrap is steadily being augmented by shipments from the country and offerings by yard dealers, industries and railroads. Heavy rejections by the steel mills have further weakened the situation. Prices are lower, but in view of the limited amount of trading, the level of the market is not clearly defined. The continued weakness of prices has been a source of surprise to some of the most experienced observers, who looked for an early recovery because of heavy current consumption and the strength of finished material prices. They also have felt that the high costs of labor required in the preparation and sorting of scrap would tend to halt the downward trend of the market. The view is now held in some quarters that users, believing prices have reached their peak, are afraid to pile up stocks and have reverted to a policy of hand-to-mouth buying. If such be the case, heavy current consumption would warrant the expectation of substantial purchases for replenishment purposes only. There is, therefore, little apprehension that prices will drop sharply, although they may recede somewhat from present levels before they stabilize. Railroad offerings include the Chesapeake & Ohio, 12,000 tons of heavy melting; Santa Fé, 3000 tons; Chicago Great Western, 500 tons, and the Big Four, a blank list.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$25.00 to \$26.00
Cast iron car wheels	26.50 to 27.00
Relaying rails, 56 and 60 lb.	28.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	27.50 to 28.00
Rails for rolling	23.50 to 24.00
Steel rails, less than 3 ft.	25.00 to 25.50
Heavy melting steel	22.00 to 22.50
Frogs, switches and guards cut apart	22.00 to 22.50
Shoveling steel	21.75 to 22.25
Drop forge flashings	18.00 to 18.50
Hydraulic compressed sheets	19.00 to 19.50
Axle turnings	19.00 to 19.50
Per Net Ton	
Iron angle and splice bars	25.50 to 26.00
Steel angle bars	21.50 to 22.00
Iron arch bars and transoms	25.50 to 26.00
Iron car axles	30.00 to 30.50
Steel car axles	24.50 to 25.00
No. 1 busheling	19.00 to 19.50
No. 2 busheling	14.00 to 14.50
Cut forge	19.50 to 20.00
Pipes and flues	15.50 to 16.00
No. 1 railroad wrought	19.50 to 20.00
No. 2 railroad wrought	19.50 to 20.00
Steel knuckles and couplers	24.50 to 25.00
Coil springs	25.50 to 26.00
No. 1 machinery cast	25.00 to 25.50
No. 1 railroad cast	23.50 to 24.00
No. 1 agricultural cast	23.50 to 24.00
Low phos. punchings	21.50 to 22.00
Locomotive tires, smooth	22.00 to 22.50
Machine shop turnings	14.00 to 14.50
Cast borings	16.00 to 16.50
Short shoveling turnings	16.00 to 16.50
Stove plate	21.00 to 21.50
Grate bars	20.50 to 21.00
Brake shoes	21.00 to 21.50
Railroad malleable	24.50 to 25.00
Agricultural malleable	23.50 to 24.00

New York

Coke Moving to France—Pig Iron Dull—Old Material Stagnant

NEW YORK, April 24.—Although the coke embargoes at Philadelphia have not been removed, permits are being issued for the shipment of coke to foreign ports and are being made in a much more orderly way than in the early days of the movement. Most of the coke is on contracts made some time ago and is for shipment to France. The coke market has developed a further weakness and furnace coke can now be had at \$6, Connellsville ovens, while foundry coke is quoted at \$7.25. Many contracts for byproduct coke have been renewed in New England, the total being about 300,000 tons on the basis of the price prevailing at the time of shipment.

Iron Ore.—Limited sales of Eastern ores have been made on a basis of about 10.50c. per unit, delivered Eastern furnace, which is about on a parity with the delivered prices being named on foreign ores and about 4c. lower than the delivered price of Lake Superior non-Bessemer ore.

Pig Iron.—The market continues to be extremely dull and reports indicate that some iron is being sold on a basis of \$29 at Buffalo, although it may not be iron manufactured in that city, as a nearby stock is competing actively for business. The American Locomotive Co. is in the market for 2100 tons for Buffalo delivery at Schenectady and for 250 tons for prompt shipment to Paterson. The William M. Crane Co. is in the market for 300 tons of foundry grades for May delivery and a chain company is inquiring for 100 tons of malleable. No sales of importance are reported for the past week.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$34.27 to \$35.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	33.27 to 34.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	32.27 to 33.27
Buffalo, sil. 1.75 to 2.25	33.41 to 33.91
No. 2X Virginia, sil. 2.25 to 2.75	34.94
No. 2 Virginia, sil. 1.75 to 2.25	34.44

Ferroalloys.—Inquiry for ferromanganese is brisker than in recent weeks. One British representative reports inquiries for about 1200 tons for shipment in the last half. The quotation is firm at \$120, seaboard, and most British sellers are not allowed to take contracts except subject to cable confirmation. One representative is still a fairly free seller for the latter part of the year. The leading domestic producer of spiegel-eisen is still out of the market and quotations are nominal at \$40, furnace, for the higher grades. Offerings of imported spiegel-eisen are not liberal and when available are bringing as high as \$50 or more, duty paid. Demand for 50 per cent ferrosilicon continues spasmodic as far as new business is concerned, but specifications on contract are very heavy. The minimum price for new business is \$95, delivered.

Cast-Iron Pipe.—Prices continue firm, but private purchasers, evidently dissatisfied with the delivery offered by makers, are slightly less active than in the past few months. A fair number of municipal tenders continue to appear. Bids opened April 25, by Fitchburg, Mass., covered about 800 tons of mostly 20-in. water pipe. Deliveries offered are now about September-October on 6-in. and smaller sizes and not much earlier for the heavier specifications. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$58.50; 4-in. and 5-in., \$63; 3-in., \$68.80, with \$4 additional for Class A and gas pipe. The soil pipe market, which was until recently extremely active, has quieted down considerably. This is believed by sellers to be the result of anticipated buying for project construction. Fearing a shortage because of heavy demand, consumers placed orders months in advance and pipe is reported to be on the ground in some instances where the work has scarcely been instituted. Jobbers' stocks are beginning to fill up except

in the New England district, where shipments continue to be hindered by railroad embargoes. Prices are still being maintained. We quote discounts on soil pipe of both Southern and Northern makers, delivered New York, as follows: 2 to 6-in. standard, 13 to 15% per cent off list; heavy, 23 to 25% per cent off list.

Warehouse Business.—Demand continues heavy in all lines, particularly for plates, but warehouse stocks of plates are lower than in other products and as shipments from mills are long delayed, many of the larger orders are not accepted. The sheet market is increasing in activity, largely for galvanized, which are at present stronger than black sheets. The range of quotations of various warehouses continues unchanged from 5.10c. to 5.50c. per lb. base on black and 6.10c. to 6.50c. per lb. base on galvanized. Spring steel is becoming increasingly difficult to obtain from mills, which object to accepting orders for small tonnages and are inclined to dictate the specifications acceptable. One large warehouse handling spring steel, which is somewhat a factor in this district, has increased its price to a basis of 5c. per lb. up to 7.50c. per lb. on the smaller sizes. Warehouses handling steel pipe report an advance in price of several dollars per ton. Sizes of 1/4 to 8 in. have been advanced \$4 per ton; 9 and 10 in., \$6 per ton; 11 and 12 in., \$8 per ton; 14 and 15 in., \$12 per ton; 16 in., \$14 per ton; 17 in. to 20 in., \$16 per ton; 21 and 22 in., \$10 per ton; and 24 in., \$8 per ton. Brass and copper warehouses have made no change in prices since March and report business good. We quote prices on page 1244.

Finished Iron and Steel.—While pressure on mills for delivery of steel under contract continues strong, there is again this week, as in the past two weeks, a marked falling off in the demand for steel for new work. Buyers are watching the situation closely, and there is apparently less inclination to pay the peak prices quoted by some mills, and as a consequence these mills are feeling less pressure upon them than are the larger interests which are booked solidly for months ahead. Some of the smaller mills did not at any time book more than one or two months' business. In plates particularly the situation is easier than it has been in many weeks. It is possible to obtain deliveries in from two to four weeks at 2.75c., Pittsburgh, but there are some quotations of 2.85c., Pittsburgh. The lessened demand for structural steel, while seasonal and therefore not unexpected, reflects the situation to a certain extent in the other major steel products. Products which bear no signs of any lessened demand are pipe and sheets. The desire of many of the sheet mills to confine their rollings to full finished sheets for the automobile industry has left the market almost bare of ordinary sheets, which are obtainable only for early delivery at fairly high prices. Blue annealed ranges from 3c. to 3.25c., Pittsburgh, with the latter price most frequent; black sheets are quoted at 3.75c. to 3.85c., Pittsburgh, while galvanized sheets range from 5c. to 5.25c., with some small sales having been made at 5.50c. There are few large inquiries in the market, even for structural work, but the inquiry of the Central Railroad of New Jersey for the first section of a bridge across Newark Bay, calling for 22,000 tons, has come into the market. Railroad car work has let down considerably, but the car builders are consuming steel at a heavy rate and have work ahead of them that will keep them busy practically throughout the year. The same is true of locomotive builders.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.69c. to 2.84c.; plates and structural shapes, 2.79c. to 2.84c.; bar iron, 2.84c.

Old Material.—The slight activity noticeable in the scrap market a week ago seems to have completely ceased. The market is stagnant with only light buying by dealers to fill old contracts and many dealers entirely out of the market temporarily, notably one buying for eastern Pennsylvania shipment in this district. No new contracts are noted, dealers hesitating to contract at lower prices. As a result there is so little business that it is difficult to determine anything more than nominal prices on most grades. Dealers shipping to Harrisburg, Claymont and Conshohocken are paying up to \$22.50 per ton delivered for strictly No. 1 heavy melt-

ing steel and this also was the prevailing price paid on latest shipments to Bethlehem. Stove plate is weak with New Jersey consumers generally out of the market and the price offered for delivery to Harrisburg, figuring back to about \$17 per ton, New York. Specification pipe is quiet and \$15 to \$16, although fairly representative of the present market, is nominal. Quotations on other grades show a decline from 50c. to \$1 and more per ton in most instances.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$18.00 to \$19.00
Steel rails, short lengths, or equivalent	19.00 to 20.00
Rails for rolling.....	22.00 to 23.00
Relaying rails, nominal.....	29.00 to 30.00
Steel car axles.....	24.00 to 25.00
Iron car axles.....	26.00 to 27.00
No. 1 railroad wrought.....	20.00 to 21.00
Wrought iron track.....	19.00 to 20.00
Forge fire	15.00 to 15.50
No. 1 yard wrought, long.....	19.00 to 19.50
Cast borings (clean).....	16.00 to 16.50
Machine-shop turnings.....	15.50 to 16.00
Mixed borings and turnings....	14.50 to 15.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	15.00 to 16.00
Stove plate	17.00 to 17.50
Locomotive grate bars.....	17.50 to 18.00
Malleable cast (railroad).....	21.00 to 22.00
Cast-iron car wheels.....	22.00 to 23.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$25.50 to \$26.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	24.50 to 25.00
No. 1 heavy cast, not cupola size	22.50 to 23.00
No. 2 cast (radiators, cast boilers, etc.)	20.50 to 21.00

Boston

Price Concessions on Buffalo and Other Kinds of Foundry Iron

BOSTON, April 24.—Buffalo iron generally has dropped to \$29.50, furnace base, for the rest of 1923 shipment, with 50c. and \$1 differentials. A Massachusetts foundry buying more than 500 tons of No. 1X and No. 2X the past week obtained No. 1X Buffalo at \$30 furnace, or \$29 base, and other irons at equal price concessions. Alabama is apparently the only iron firmly held, presumably because furnaces are sold ahead on low silicons through October. While irons are offered at concessions it is difficult to determine the full significance of prices due to the limited prospects and passing business. A Springfield, Mass., foundry inquiring on 600 tons of No. 1X third quarter iron has withdrawn from the market, and a New Hampshire machinery maker's 300-ton requirements have not been covered. A Pacific Coast foundry is inquiring in this market for 1000 tons of English, silicon 2.50 plus. Otherwise most business in sight is confined to unimportant tonnages. New England foundry operations are curtailed by a scarcity of molders. Melters are fairly well covered, under labor conditions, on first half iron requirements, and in many instances are even more extended, therefore show diminishing interest in last half iron pending possible price developments.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$35.15 to \$36.65
East. Penn., sil. 1.75 to 2.25.....	34.65
Buffalo, sil. 2.25 to 2.75.....	34.91 to 35.41
Buffalo, sil. 1.75 to 2.25.....	34.41
Virginia, sil. 2.25 to 2.75.....	34.92 to 35.42
Virginia, sil. 1.75 to 2.25.....	34.42 to 35.92
Alabama, sil. 2.25 to 2.75.....	38.10
Alabama, sil. 1.75 to 2.25.....	37.60

Soil Pipe.—Soil pipe foundries are buried with business, and well behind on shipments notwithstanding railroads are issuing more permits to ship than heretofore. New England makers are quoting extra heavy 2 to 5 in. single and double head pipe at 20, 10, 10 and 5 per cent discount, contrasted with 27, 10, 10 and 5 per cent a month ago. For fittings they quote 7, 10, 10 and 5 per cent discount.

Warehouse Business.—Warehouse prices on wire nails have advanced 20c. to \$4.10 per keg base; barbed wire 8c. by the reel and 10c. by the 100 lb.; sheet copper is now 28½c. per lb. and copper rods 30½c.; machine screws are 10 per cent higher; and heavy hammers

and crowbars will shortly be advanced, according to advices received from makers. Iron and steel prices remain as heretofore, but are reported as strong, with the movement out of stock quite free. Leading warehouses continue to receive moderate shipments from mills, which serve to keep local stocks in fair condition.

Jobbers quote: Soft steel bars, \$3.61½ per 100 lb.; flats, \$4.40; concrete bars, \$3.76½ to \$3.89; structural angles, channels and beams, \$3.71½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$8 to \$10; crucible spring steel, \$12; bands, \$4.80 to \$5.30; hoop steel, \$5.80 to \$6.30; cold-rolled steel, \$4.50 to \$5; toe calk steel, \$6.15; refined iron, \$3.61½ per 100 lb.; best refined iron, \$4.75; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10; steel plates, \$3.71½ to \$3.97½; No. 10 blue annealed sheets, \$4.61½ a 100 lb.; No. 28 black sheets, \$5.65; No. 28 galvanized, \$6.65.

Coke.—The New England Coal & Coke Co. has closed its books on second half by-product foundry coke contracts. This company, as well as the Providence Gas Co., reports satisfactory business, the New England taking more tonnage than ever before for any similar period. Last half contracts were taken on a price ruling date of shipment basis, which means a sliding scale. Both oven interests are maintaining current prices, \$15 to \$16 delivered within the \$3.10 freight rate zone. The New England Coal & Coke Co., however, has reduced its price on egg coke from \$13 to \$11.25 ovens. Iron, as well as brass foundries, have covered fairly freely on the new price basis.

Old Material.—Certain kinds of scrap are fairly active on buying for new, as well as old, contracts, but broadly speaking the market remains quiet, with a still further shading of prices necessary to close business. Heavy melting steel is the weakest spot in the list, largely because of the withdrawal of a heretofore active broker. Early in the past week sales were put through at \$18.75 shipping point. Since then \$18 and \$18.50 has been done representing a drop of \$1.50 a ton in a week. Yard wrought is fairly active at \$18.50 to \$19 on cars and occasionally \$19.50. Railroad wrought is wanted but hard to obtain. Mixed borings and turnings are more active, early sales running as high as \$15.50, and subsequent \$14.50 and \$15 on cars. Other kinds of borings and turnings have little call. A Portland, Me., rolling mill has taken small tonnages of shafting, in short supply. Forge fire scrap early in the week sold at \$17, later dropped to \$15.50, and is now bid \$14.50 to \$15 on cars. Cast scrap has grown comparatively inactive with \$28 to \$28.50 the nominal market. A sale of 100 tons No. 1 within the last day or two at \$27.75 delivered suggests a weakening.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$28.00 to \$28.50
No. 2 machinery cast.....	26.00 to 26.50
Stove plate	20.50 to 21.00
Railroad malleable	26.50 to 27.00
Street car wheels	25.50 to 26.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$18.00 to \$18.50
No. 1 railroad wrought.....	20.50 to 21.00
No. 1 yard wrought.....	18.50 to 19.00
Wrought pipe (1 in. in diam., over 2 ft. long).....	15.00 to 15.50
Machine shop turnings	14.50 to 15.00
Cast iron borings, rolling mill.....	15.50 to 16.00
Cast iron borings, chemical.....	19.00 to 19.50
Blast furnace borings and turnings	14.50 to 15.00
Forged scrap and bundled skeleton	14.50 to 15.00
Shafting	22.00 to 23.00
Street car axles.....	22.00 to 23.00
Rails for rerolling.....	20.00 to 21.00

Detroit Scrap Market

DETROIT, April 23.—Prices on old materials remain practically the same as those quoted a week ago, and the market is strong with dealers interested in all tonnages offered.

The following prices are quoted on a gross ton basis f.o.b. cars producers' yards, excepting stove plate, automobile and No. 1 machinery cast, which are quoted on a net ton basis:

Heavy melting steel.....	\$23.00 to \$24.50
Shoveling steel	23.50 to 24.50
No. 1 machinery cast.....	27.00 to 28.50
Cast borings	28.00 to 28.50
Automobile cast scrap.....	29.00 to 32.00
Stove plate	20.00 to 22.00
Hydraulic compressed	20.25 to 21.25
Turnings	17.00 to 18.00
Flashings	18.25 to 19.25

Cincinnati

Pig Iron Quiet with Prices Being Shaded by Some Sellers—Scrap Prices Soft

CINCINNATI, April 24.—The pig iron market is softer and continues exceptionally quiet. Only two sales of consequence were reported in this territory last week. One of these was for 1500 tons of off grade Southern iron taken by a pipe company, and the other of 300 of standard Southern to a central Ohio melter. One company, it is understood, has bought 1600 tons of malleable this week on a \$29.50 Iron-ton basis from a southern Ohio furnace. It is said that \$30.50, Iron-ton, for foundry iron, has been quoted by more than one seller. Whether this price has been done by furnaces is not known, but brokers who have some resale material have quoted on this basis. While the market remains quiet, with a softer tendency, there is no apparent diminution in the melt, and furnaces are being asked to anticipate shipments. The Southern market remains firm at \$27, Birmingham, with little iron being sold. It is said that 70 per cent of the iron produced in Alabama is now being melted in that State, leaving 30 per cent for shipment into other districts. Some of this will likely go to the Pacific Coast, where it is said English and Chinese iron, which usually dominates the trade, is not available on account of increased demand from the continent as a result of the Ruhr occupation.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Iron-ton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	\$31.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	31.55
Ohio silvery, 8 per cent	41.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	\$32.27 to 33.27
Basic Northern	32.27
Malleable	32.27 to 33.27

Structural Material.—There is little activity in the structural field, although a number of projects involving less than 100 tons are up for bids. Eight highway bridges in West Virginia, now being figured, will total about 600 tons, and a number of highway bridges in Indiana will run up to 300 tons. No awards of importance have been made during the week.

Warehouse Business.—Local jobbers continue to report a brisk demand for finished materials of all kinds, with prices remaining very firm. It is expected a further advance of \$2 per ton will shortly become effective in common wire products, but no changes are anticipated in the heavier products.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c. cold-rolled rounds, 4.25c. cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6c.; No. 9 annealed wire, \$3.30 to \$3.40 per 100 lb.; common wire nails, \$3.40 per keg base.

Finished Materials.—A tapering off in the demand for finished materials was noted during the past week. It is now generally conceded that consumers are fairly well covered for the second quarter, and with shipping conditions improving there is no desire on their part to enter the market unless absolutely forced. The general policy being pursued is to buy what is actually needed for the work in hand, and as most consumers have contracts that will keep them busy for some months, they have covered for their requirements as far as the mills would book them. Delivery promises seem to be improving, and 90-day deliveries can now be made by some of the larger mills on at least some of their products. Some mills have open capacity for the heavier shapes and plates for fairly early delivery, and are taking on some business. On bars, shapes and plates, for three to four months' delivery, 2.45c. represents the market, but on a 60-day delivery, 2.75c. has been pretty generally done. For prompt shipment an Eastern mill has quoted 3.25c. on plates, and has taken some small orders. Manufacturers of pipe have advanced prices an average of \$4 per ton, effective April 19. The American Steel & Wire Co. has advanced prices of common wire products \$2 per ton, making galvanized barb wire, 3.80c., plain wire 2.75c., and common wire nails, \$3 per keg base. Sheet prices seem to be easier, particularly on

galvanized, and where last week 5.50c. had been quoted, the top of the market today hardly exceeds 5.25c. for any delivery, and ranges downward, with all stages in between quoted, to 5c. Blue annealed sheets are quoted at 3.25c., and black at 4c. The U. S. Cast Iron Pipe & Foundry Co. has taken 2200 tons of cast iron water pipe for the new model town of Moriemont, near Cincinnati.

Coke.—By-product lake contracts for the month of May will be made at \$10, Connellsville, basis, a reduction of \$1 per ton. The fuel situation is weaker with the possible exception of the New River operations, where the two leading producers are sold up for the second quarter. Connellsville furnace coke is quoted at \$6, foundry at \$8, New River foundry \$13 to \$14, Wise County furnace \$7.50, and foundry \$8.50.

Old Material.—The scrap market is showing little activity and prices are softer on most grades. Foundries are buying sparingly of cast iron and short rails, but steel mills in this district are not active purchasers. One of the mills offered \$24, delivered, for 10,000 tons of heavy smelting steel, but no dealer would take the order at this figure. Cast borings are in only fair demand. Relaying rails, however, are holding steady on fair demand, as is machinery cast, which is scarce.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$17.00 to \$17.50
Iron rails	19.00 to 19.50
Relaying rails, 50 lb. and up	29.50 to 30.00
Rails for rolling	21.00 to 21.50
Heavy melting steel	21.00 to 21.50
Steel rails for melting	19.50 to 20.00
Car wheels	21.50 to 22.00
Per Net Ton	
No. 1 railroad wrought	18.50 to 19.00
Cast borings	15.50 to 16.00
Steel turnings	14.50 to 15.00
Railroad cast	22.00 to 22.50
No. 1 machinery cast	24.50 to 25.00
Burnt scrap	17.00 to 17.50
Iron axles	27.50 to 28.00
Locomotive tires (smooth inside)	20.00 to 20.50
Pipes and flues	14.50 to 15.00

St. Louis

Pig Iron Market Quiet with Prices Firm—Old Material Weak

ST. LOUIS, April 24.—The market for pig iron continues quiet. The only buying is in small quantities for immediate shipment, little interest being shown in third quarter deliveries. The melt in the district continues heavy, however, and melters are insisting on shipments against contracts. Stocks in hands of melters are low. The stove foundries' consumption has been reduced by a strike in the Belleville plants. A falling off in inquiries is reported by gray casting foundries, although they still have sufficient business booked to take care of their needs for the next three months. Implement makers are busy. The only new inquiry of note is from a local pulley manufacturer, who wants 1000 tons of mixed analyses iron. The market is firm at \$32, Chicago, for Northern iron and \$27, Birmingham, for Southern make.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	\$34.16
Northern malleable, sil. 1.75 to 2.25	34.16
Basic	34.16
Southern fdy., sil. 1.75 to 2.25	32.17

Coke.—The coke situation is easier than it has been for several months. Considerable coke is coming from the Connellsville district, as well as from the South. Domestic coke demand has dropped off considerably, following warmer weather.

Finished Iron and Steel.—Chief interest in structural steel lies in the Federal Reserve Bank Building here, the general contract for which was awarded to the Westlake Construction Co., St. Louis. Orders for the material, including 2750 tons of structural steel and 300 tons of reinforcing bars, will be let as soon as the contract is signed. Railroad inquiries are few and for small quantities. Business generally is quiet, with only

a few inquiries for third quarter requirements. One of the largest mills has been trying to get business it would not have considered taking on a few weeks ago.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, cold rolled, one pass, 5c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{7}{8}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, \$2.50; and tapped, \$2.50 off list.

Old Material.—The market for old material continues to show weakness, with the exception of relaying rails, in which the heavy demand continues. Prices generally are lower. Railroad offerings are heavier and include lists of several thousand tons each from the Texas & Pacific, International & Great Northern and Frisco systems. Consumers are out of the market and will be for the next 60 days. The only activity is between dealers.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron rails	.....	\$21.00 to \$21.50
Rails for rolling	.....	22.00 to 22.50
Steel rails, less than 3 ft.	.....	23.00 to 23.50
Relaying rails, standard section	.....	37.50 to 39.00
Cast iron car wheels	.....	26.50 to 27.00
Heavy melting steel	.....	20.00 to 20.50
Heavy shoveling steel	.....	19.00 to 19.50
Frogs, switches and guards cut apart	.....	21.50 to 22.00
Per Net Ton		
Heavy axles and tire turnings	.....	16.00 to 16.50
Steel angle bars	.....	20.00 to 20.50
Iron car axles	.....	27.50 to 28.50
Steel car axles	.....	24.00 to 24.50
Wrought iron bars and transoms	.....	25.00 to 25.50
No. 1 railroad wrought	.....	18.50 to 19.00
No. 2 railroad wrought	.....	18.50 to 19.00
Railroad springs	.....	24.00 to 24.50
Steel couplers and knuckles	.....	24.00 to 24.50
Cast iron borings	.....	14.50 to 15.00
No. 1 busheling	.....	17.50 to 18.00
No. 1 railroad cast	.....	23.00 to 23.50
No. 1 machinery cast	.....	23.00 to 23.50
Railroad malleable	.....	23.50 to 24.00
Machine shop turnings	.....	13.50 to 14.00

Buffalo

Pig Iron Dull with Prices Slightly Lower, with \$29 Base Prevailing

BUFFALO, April 24.—Production of pig iron, both merchant and for use by the makers themselves, is maintained, but there is very little third quarter activity and none for fourth quarter. One inquiry for 2000 tons and another for 1000 tons, both New York State inquirers, represent the largest tonnages on which prices have been sought; all other inquiries deal with carload lots up to 200 tons. Malleable is firm at \$30. Buffalo sellers uniformly state that \$29 base price has not been shaded. Furnaces are fairly well sold up on second quarter business, and while the majority have comfortable tonnages booked for third quarter, the impression is general that considerable third quarter iron has not been bought, and this will be placed before the end of May. The \$29 base price applies on both second and third quarter business.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for shipment this month:

No. 1 foundry, 2.75 to 3.25 sil.	.....	\$30.00 to \$30.50
No. 2X foundry, 2.25 to 2.75 sil.	.....	29.50 to 30.00
No. 2 plain, 1.75 to 2.25 sil.	.....	29.00 to 29.50
Basic	.....	30.00
Malleable	.....	30.00
Lake Superior Charcoal	.....	37.28

Warehouse Business.—Structural shapes and sheets are moving in unusually big volume; mills are unable to meet demands for shapes, throwing the largest volume of business in this material to warehouses. Warehouses have adjusted prices as shown in schedule.

Finished Iron and Steel.—Several agencies find a lessening in demand, but the general trend is as brisk as it has been all spring. There is a difference in quotations on black sheets; some sellers are quoting 3.85c. and others 4.00c. Demand for galvanized sheets is especially brisk; all users report difficulty in placing

orders. The lowest bar price is 2.45c., and the usual quotation is 2.50c.; shapes and plates are quoted at 2.60c. Several 100-ton lots of bars have been inquired for. Canadian demand is not so brisk as on this side of the border. A leading maker of major products is taking reservations for bars, shapes, plates and billets on a price basis to be determined later.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5.10c.; cold rolled round shafting, 4.45c.

Old Material.—Mills are not interested in buying any old material except borings and turnings. Heavy melting steel is inactive; dealers are working on old orders and trading between themselves to fill in tonnages is keeping prices at the same level of recent weeks. Rejections in steel are unusually high and indicate that mills are fairly well stocked and able to demand more rigid inspection.

Heavy melting steel	.....	\$24.50 to \$25.00
Low phos., 0.04 and under	.....	28.00 to 29.00
No. 1 railroad wrought	.....	22.00 to 23.00
Car wheels	.....	26.00 to 27.00
Machine shop turnings	.....	18.00 to 19.00
Cast iron borings	.....	19.00 to 20.00
No. 1 busheling	.....	22.50 to 23.00
Heavy steel turnings	.....	23.00 to 23.50
Stove plate	.....	23.00 to 24.00
Grate bars	.....	23.00 to 24.00
Bundled sheet stampings	.....	18.00 to 19.00
No. 1 machinery cast	.....	26.00 to 27.00
Hydraulic compressed	.....	22.50 to 23.00
Railroad malleable	.....	27.50 to 28.50

Cleveland

Ore Rate Decision Disappointing—Pig Iron Dull—Scrap Declines

CLEVELAND, April 24.—The ore rate decision handed down by the Interstate Commerce Commission Monday was received with keen disappointment by the leading independent iron ore interests, as they had hoped that the decision would be more favorable to ore producers in the old range. The decision followed the recommendations contained in the report of the examiner of the commission made last year, to which members of the Lake Superior iron ore filed a demurrer and on which a hearing was had later. While it is too early to determine what will be done, it seems probable that the mining companies will make further efforts to secure a reduction of the old range rates. The decision is favorable to the ore men to the extent that they will enjoy the advantages of the reduced rates on old range ore, as ore contracts this year do not contain riders giving consumers the benefit of any possible reduction in rail rates on ore.

The vessel rate on ore seems to have been definitely established at 80c. per ton from the head of Lake Superior, which is an advance of 10c. a ton over last year. Considerable vessel capacity has been contracted for at the advance.

Iron Ore.—During March 5,473,704 gross tons of Lake Superior ore were consumed as compared with 4,670,787 tons during February, and with 3,067,451 tons during March last year. In October, 1918, 5,499,928 tons of Lake Superior ore were consumed, which appears to be the record. That the consumption last month did not exceed this record is because much less lake ore is being used now by Eastern furnaces than in 1918. The total amount at furnaces and Lake Erie docks April 1 was 25,120,836 tons, as compared with 28,150,666 tons on the same date a year ago. Stocks at furnace yards April 1 were 18,495,730 tons, as compared with 22,600,686 tons on March 1. The ore market is dragging. Some business is pending, but consumers are slow in placing contracts. No announcement has as yet been made by the Steel Corporation regarding the expected wage advance for miners in the Lake Superior district.

Pig Iron.—The pig iron market is duller than it has been for many weeks. Sales during the past week were few in number and limited to small tonnages, some for prompt shipment and some for the third quarter. Many consumers have not yet purchased iron

for the third quarter, but show no disposition to buy at the present time. The favorable feature of the situation in respect to producers is that the melt continues heavy and consumers are crowding furnaces for deliveries. Prices show no definite change, but there have been no recent inquiries of sufficient size to test the market. Lake furnaces are holding to \$31.50 and Valley furnaces to \$31 for foundry iron, but the lower Buffalo prices might have some effect on quotations in this territory on round tonnages. At \$29.50, the ruling Buffalo price, Buffalo iron can be delivered as far west as Indianapolis at the same price as Ironton iron at \$31. The only inquiries of any size is one from Canton for 500 tons and another from Galion for 300 tons for the third quarter. Steel making iron is inactive.

One of the River furnaces of the McKinney Steel Co. developed a hot spot during the week and went out of blast. One of the Detroit furnaces of the Hanna Furnace Co., which has been out for repairs for several weeks, will be blown in early in May.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$31.00
Northern No. 2 fdy., sil. 1.75 to 2.25	\$32.15 to 32.77
Southern fdy., sil. 1.75 to 2.25	33.00
Malleable	32.15 to 32.77
Ohio silvery, 8 per cent.	42.52
Standard low phos., Valley furnace	35.00 to 36.00

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are good, and new business is fair. Some manufacturers are getting the new prices, but others have not placed in effect the announced 10 per cent advance. Rivet specifications are not so heavy as during the latter part of March, but manufacturers are well filled with orders. The leading local producer is not attempting to get above 3.25c. for structural and 3.35c. for boiler rivets, and there are reports that these prices are being shaded occasionally by outside makers. Small rivets are quoted at 65 per cent off list.

Semi-Finished Steel.—Some inquiries for sheet bars are coming out for third quarter. However, mills are not yet ready to quote for that delivery. While sheet bars, billets and slabs are commonly quoted at \$47.50, a recent purchase of slabs was made at \$45, Youngstown, and the price range appears to be from \$45 to \$47.50.

Sheets.—Consumers are well covered with contracts and inquiries are only moderate. At least two mills are quoting galvanized sheets at 5c., but some are trying to get 5.25c. Black sheets range from 3.85c. to 4c. Blue annealed sheets are very scarce with 3.25c. as the more common quotation. Plate mills are quoting light plates in blue annealed gages at the same price.

Reinforcing Bars.—A good volume of new work is being figured on. Inquiries include a bakery in Toledo requiring 250 tons and a store building in Portsmouth, Ohio, taking 175 tons. Rail steel reinforcing bars are quoted at 2.50c. and so far steel reinforcing bars are held at the same price.

Finished Material.—The volume of inquiries for steel for extended future deliveries has slackened and the demand for material for early shipment has also become less active. The development of a feeling in some quarters that with lower fuel costs declining scrap prices and less strength in the pig iron market, price advances on steel would be checked, has been followed by an advance by the leading interest to 2.40c. for steel bars and 2.50c. for plates and structural material. Some of the leading independent producers have fallen in line with these advances. Steel bars going with plate and structural orders are also commanding the 2.50c. price. Local mills are quoting higher prices for plates for shipment in four to eight weeks, the range now being 2.85c. to 3c. Eastern mills are quoting plates at 2.90c. to 3c. for about the same deliveries. Strip steel is quoted at 3.50c. for hot-rolled and 5.50c. for cold-rolled for second quarter shipment. Some of the mills taking premium business are declining considerable of the tonnage offered, as they are unwilling to allow their order books to become so loaded that

they cannot make shipments within six to eight weeks. One large producer continues to make reservation of steel bars for the third and fourth quarters subject to prices to be named later. The labor shortage is affecting mill operations and some producers find that with the curtailment in their production delivery of orders now on their books will be more extended than had been expected. Some of the implement manufacturers are sounding the market on steel bars for fall delivery for making their next season's product. Very little inquiry is coming out in the building field. Warehouse orders for steel, particularly for structural material and plates, are heavy.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.90c.; No. 10 blue annealed sheets, 3.90c. to 4.06c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Old Material.—With the depressing influence of an inactive market, scrap prices have further declined about \$1 a ton on heavy melting steel and most other grades. Not only are local mills not buying, but most of them are not accepting shipments because material is coming in faster than wanted. With the Cleveland demand largely shut off, the bulk of the local scrap is being shipped into the Youngstown district. No buying is reported by mills in that district, but a limited tonnage is being purchased by dealers against contracts with Valley district mills.

We quote per gross ton f.o.b. Cleveland as follows:

Heavy melting steel.....	\$23.25 to \$23.50
Rails for rolling	26.00 to 26.50
Rails under 3 ft.	26.00 to 26.50
Low phosphorus melting.....	26.25 to 26.50
Cast borings	18.75 to 19.25
Machine shop turnings	18.50 to 19.00
Mixed borings and short turnings	18.50 to 19.00
Compressed sheet steel.....	22.00 to 22.25
Railroad wrought	21.00 to 21.25
Railroad malleable	28.50 to 29.00
Light bundled sheet stampings.....	18.00 to 18.25
Steel axle turnings.....	21.00 to 21.50
No. 1 cast	29.00 to 30.00
No. 1 busheling	17.50 to 17.75
Drop forge flashings	20.50 to 20.75
Railroad grate bars	23.00 to 24.00
Stove plate	23.00 to 24.00
Pipes and flues	18.00 to 18.50

Birmingham

Very Little Activity in Pig Iron—Charcoal Is Advanced \$1

BIRMINGHAM, ALA., April 24.—Pig iron buying reached a new low ebb last week. One maker's total was 600 tons, one 500-ton lot and the rest carloads. Others made similar reports. The two largest makers were among those reporting business confined to small lots for prompt delivery. The only feature of the week was an inquiry from a harvester company for 2000 tons for second half. Only that tonnage desired for third quarter was placed. All sales were on a \$27 base and makers do not confirm reports at competitive centers of any Alabama iron being held at higher prices. Melters are satisfied because they ordered for second half and part of third quarter and the iron is being delivered promptly. Railroads are remarkably efficient. Labor is tranquil. Production both of iron and steel remains at maximum with maximum consumption and not a nervous note is heard anywhere. A sale of 2000 tons of charcoal iron is reported. That iron is now firm at \$35.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$27.00
Basic	26.00
Charcoal, warm blast.....	35.00

Finishing Mills.—The Tennessee company shipped out of Mobile last week 3500 tons of rails for Yokohama, 3849 tons for Kobe and 1945 tons for Fusan, besides 1000 tons of spikes, bolts, nuts, rivets, bar steel and angle bars. Cuba took 200 tons of wire. Bar steel is at 2.70c. f.o.b. Birmingham. All steel mills are at capacity production.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has booked 1000 tons of De Lavaud pipe, 6 to 8 in., for Miami, Fla., and 700 tons for Duncan, N. C., close on the heels of 5000 tons for Fort Smith, Ark., and 1100 tons for Memphis. The base is \$49. Sanitary pipe is fairly quiet, but the shops are full. The base is \$75 for Standard. The Birmingham Machine & Foundry Co. began operations last week of a sanitary pipe shop of 12 floors with 45 tons per diem capacity.

Coal and Coke.—The Aluminum steamship line has begun semi-monthly movement of Alabama coal to the Windward Islands along with miscellaneous cargo. The first cargo of 1000 tons went to Georgetown last week. Standard foundry coke brings \$9 for spot delivery.

Old Material.—The scrap market has become quiet following several weeks of considerable activity. Consumers appear to be well supplied for the present, although No. 1 cast is fairly active.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Old steel rails.....	\$18.00 to \$20.00
No. 1 steel.....	16.00 to 18.00
No. 1 cast.....	24.00 to 25.00
Car wheels.....	24.00 to 25.00
Tramcar wheels.....	23.00 to 24.00
Stove plate.....	18.00 to 19.00
Cast iron borings.....	12.00 to 13.00
Machine shop turnings.....	12.00 to 13.00

San Francisco

Pig Iron Prices Strongly Held While Demand Is Fairly Active

SAN FRANCISCO, April 18.—Strongly maintained prices and a continuously steady buying inquiry are the two outstanding features of the market for pig iron. Although prices have been considered high for some time past, the situation has sufficiently strengthened to warrant a further advance, and the best grades are now held for \$39 to \$40 per ton, depending upon the circumstances usually incident to individual transactions. There is no shading of the minimum figure, however, and the market has a clearly defined upward trend. Business conditions as to iron and steel products are good, and while buyers confine their purchases to as small lots as immediate requirements will permit, the aggregate demand is ample to absorb average supplies, and there is no undue accumulation of material. In anticipation of higher prices, some importers purchased freely some time ago for future delivery, and there is considerable tonnage afloat to arrive here during the next three months. It is stated that some orders for domestic iron have been placed recently for delivery at gulf ports for shipment to this coast via the Panama Canal. Following the example of the importers, some of the larger buyers bought liberally two and three months ago, and although they assumed they were well provided for, they now find their business so greatly increased that they will be obliged to again enter the market as buyers within a few weeks, or about three months earlier than expected. This evidences the active healthy tone of the market.

Pig Iron Market.—The imports of pig iron by sea during March totaled 2875 tons, all of it being from the United Kingdom. There is no official record of the imports of domestic iron and receipts by rail, which are of small proportions, cannot be learned, but estimates place the total by canal at a little more than the foreign imports by sea.

Coke.—There is very little free foreign coke in the market at present and the bulk of the cargoes en route is already sold, so there is every indication at the moment that supplies will barely meet requirements for a brief period. Because of the adverse economic conditions in Europe, the allotments of English coke for the Pacific Coast have been somewhat curtailed. Those consumers who failed to buy ahead now have to pay from \$24 to \$25 per ton for their requirements. The price is high and it is not being shaded. This, of course, applies to the best grades of foundry coke.

While there are comparatively few inquiries for domestic coke, there is some business in progress at \$14 to \$15 per ton for West Virginia and \$11 to \$12 per ton for Birmingham. There has been some coke brought here from Utah, and although it has not been very fully tested out, the report is current that it is scarcely up to requirements for foundry purposes but satisfactory for smelting uses. March imports by sea were 1590 tons.

Finished Iron and Steel.—The demand for structural material continues steady with a firmness in prices which seems to presage an era of summer activity of greater volume than for several years. The high price of structural steel is apparently no barrier to the erection of large edifices, and there is a considerable number of apartment houses of large size now being planned, in which concrete with steel reinforcement will figure chiefly in construction. The demand for steel bars and plates is fully 25 per cent greater this year than in the two preceding years. Sheet steel is selling in a quiet way with supplies moderate and prices well sustained. The inquiry for bolts, nuts and rivets for agricultural machinery, automobile workers and railroads is fairly active, with buyers showing some little hesitancy in paying asking figures. There is some talk about two large orders having been recently placed at slightly shaded prices, but the figures are unobtainable.

Old Material.—There is considerable material on the market, and the buying inquiry, while broad in scope, is rather contracted as far as the size of orders is concerned. The price on average lots of scrap ranges from \$14 to \$15 per ton for ordinary melting purposes, while desirable round lots of rails would readily bring \$1 higher. On the Pacific Coast the quantities of scrap are usually insufficiently large to warrant grading for sale, the foundries usually buying in mixed parcels at general average prices. They make the assortment and use each grade in the kind of work to which it may be best adapted. For this reason prices here are confined within a narrow range and an average which is difficult to compare with scrap prices in the Eastern States, where each grade has its own market value. There is one feature of the market quite noticeable, and that is the greatly increased accumulations of scrap at many points contiguous to transportation facilities, this action doubtless being based on the high prices now obtainable for this class of old material. Prices range fully 30 to 50 per cent higher this year than at the corresponding period of last year. Both supply and demand show a substantial increase also, and dealers confidently believe prices will be higher.

Philadelphia

Markets Continue Quiet But Prices Hold Except on Scrap

PHILADELPHIA, April 24.—There is very little activity in the steel, pig iron or scrap trade in the East. Pig iron is unusually dull, but prices hold firm. Eastern plate and structural mills are not getting more than a fraction of the new business that was being booked last month, and as a consequence the delivery situation promises to become slightly easier soon. The scrap market is being allowed to drift and prices still tend downward.

Pig Iron.—The demand for pig iron amounts almost to nothing, but as consumers are known to be well covered for the remainder of the first half, there is no surprise to sellers in this development. The furnaces have large backlogs for three months or longer, and as a good deal of third quarter buying is still to be done, the operators and their sales agents will be content to wait for the buyer to come back into the market. Prices are holding firm on the basis of \$31, furnace, for foundry iron, and there is no apparent intention on the part of sellers to shade this level even though the few buyers who have come into the market have sought concessions in price. Usually in a waiting market of

this kind the conditions favor the buyer, but now the situation may be reversed in that many consumers will need more tonnage before the furnaces have exhausted the orders on their books. A somewhat surprising development is the offering for sale of small lots of resale iron at about \$1 a ton below current furnace quotations. This iron is coming from melters who early in the year bought more than they needed. The aggregate of such tonnage is not large and it is not believed that the offering of this iron will in any way affect the underlying strength of the market. A steel company which is not regularly a user of pig iron bought about 4000 tons of basic several weeks ago when a shortage of scrap appeared imminent, and now that the scrap supply has become plentiful, it has re-sold this iron to another steel company. This is the only recent pig iron transaction of importance.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$31.76 to \$32.64
East. Pa. No. 2X, 2.25 to 2.75 sil.	32.76 to 33.64
East. Pa. No. 1X, 2.25 to 2.75 sil.	33.76 to 34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	33.67 to 34.17
Virginia No. 2X, 2.25 to 2.75 sil.	34.67 to 35.17
Basic delivered eastern Pa.	31.00 to 31.50
Gray forge	29.50 to 30.00
Malleable	33.14 to 33.64
Standard low phos. (f.o.b. furnace), nominal	35.00
Copper bearing low phos. (f.o.b. furnace)	33.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.	
Continental foundry, 1.80 to 2.50 sil.	\$31.00
Continental foundry, 2.50 to 3 sil.	32.00
Low phos. copper free, guar. not over 0.035 per cent phos.	35.36
Continental, phos. 1.50; sil. 2 to 3	31.50

Semi-Finished Steel.—Eastern mills quote \$45 to \$47.50, Pittsburgh, for open hearth rerolling billets and \$53 to \$55, Pittsburgh, for forging billets.

Plates.—While there is still an active demand for small lots of plates, particularly from points west, the volume of business being booked by Eastern mills is not nearly so heavy as it was a few weeks ago. At that time it was very easy for any mill to sell considerably more steel than it was shipping, while today orders are running less in volume than shipments. If this condition continues for another few weeks, it will undoubtedly be possible to obtain plates for shipment within two or three weeks, as some of the mills have not at any time this year sold up for more than four to six weeks ahead. Today's price range is 2.65c. to 2.75c., Pittsburgh. A quotation of 2.85c., Pittsburgh, by one mill, has disappeared, as under present conditions it is not easy to obtain that price. A Pittsburgh car builder is in the market for a few thousand tons for June shipment. An Eastern mill will probably supply the tonnage which apparently cannot be had in the Pittsburgh district.

Structural Material.—The falling off in inquiry for steel for building construction has lessened the volume of new tonnage being put on mill books, but the pressure for deliveries on old orders continues without abatement. A good deal of building work is in progress in Philadelphia and vicinity and shipments of steel for this work are heavy. Eastern structural mills which have been quoting the peak prices find pressure for prompt delivery material less active, but there has been no change in quotations, which are 2.85c. to 3c., mill, for plain material. Some business is being taken by the larger interests at 2.45c. to 2.50c., Pittsburgh.

Bars.—Large consumers of steel bars are finding it slightly easier to get mill quotations for such deliveries as they can offer, these deliveries usually ranging from three to four or five months. A quotation was made by one mill for shipment in three months at 2.50c., Pittsburgh. Small lots for earlier shipment bring higher prices, frequently 2.75c., Pittsburgh. Bar iron is firm at 2.50c., Pittsburgh, but the demand is less.

Sheets.—Sheets continue in strong position. Blue annealed are firm at 3.25c., Pittsburgh, while buyers have offered 3.50c. for prompt shipments, usually impossible to obtain. Black sheets are about 3.85c. and

galvanized from 5c. to 5.50c., prompt shipments being unobtainable at less than 5.25c., Pittsburgh. While the tin plate price continues nominally at \$5.50 per base box it is difficult to buy at that for delivery in first half. Companies which have entered contracts for second half business have done so with the price to be named later.

Warehouse Business.—Prices for steel out of stock continue unchanged and are as follows:

Soft steel bars and small shapes, 3.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ⅜ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼-in., 5.40c.; ⅜-in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ⅜-in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.

Coke.—Blast furnace coke is now available for prompt shipment at \$6 to \$6.50, Connellsville, depending on quality. Foundry coke is about \$1 a ton higher.

Old Material.—The scrap market continues in its dull and drifting course, with the trend of prices still downward. Heavy melting steel has not changed within the week from a minimum of \$23, delivered, but some other grades have declined from 50c. to \$1 a ton or more. An exception is railroad malleable scrap, which is in good demand, and sellers can obtain \$26 to \$28, delivered, according to character of the material.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$23.00 to \$24.00
Scrap rails	23.00 to 24.00
Steel rails for rolling	24.00 to 25.00
No. 1 low phos., heavy 0.04 and under	30.00 to 31.00
Cast iron car wheels	26.00 to 27.00
No. 1 railroad wrought	26.00 to 27.00
No. 1 yard wrought	24.00 to 25.00
No. 1 forge fire	20.00 to 21.00
Bundled sheets (for steel works)	19.50 to 20.00
No. 1 busheling	23.00 to 24.00
Mixed borings and turnings for blast furnace use	17.50 to 18.50
Machine shop turnings (for steel works use)	19.50 to 20.50
Machine shop turnings (for rolling mill use)	20.00 to 20.50
Heavy axle turnings (or equivalent)	21.50 to 22.50
Cast borings (for steel works and rolling mills)	20.00 to 21.00
Cast borings (for chemical plants)	24.00 to 26.00
No. 1 cast	25.00 to 27.00
Heavy breakable cast (for steel plants)	23.00 to 24.00
Railroad grate bars	21.00 to 22.00
Stove plate (for steel plant use)	20.00 to 21.00
Railroad malleable	26.00 to 28.00
Wrought iron and soft steel pipes and tubes (new specifications)	19.50 to 20.50
Shafting	26.00 to 28.00
Steel axles	26.00 to 28.00

Car and Labor Shortages Hinder Deliveries of Refractories

PITTSBURGH, April 23.—There has been no change in refractories prices since the advance announced late last month, but some of the smaller producers are said to be talking further advances. Demand still is reported to be good, although not quite as insistent from the iron and steel industry as was the case a short time ago. So far as can be ascertained, all consumers are getting ample supplies for all immediate requirements and with evidence lacking of any serious shortage, it is rather doubtful whether prices could be advanced and the higher levels maintained. Actually, under cover of predictions of higher prices, there are some makers of silica brick who are taking orders below the quoted figures. The general situation is very little changed, except that in Pennsylvania, makers are obliged to stock some brick, due to the scarcity of cars and the fact that the labor supply for loading is insufficient. Prices are given on page 1217.

MORE WORKERS AND HIGHER PAY

Increasing Employment and Average Wages in Identical Metal Working Shops

WASHINGTON, April 24.—An increase of 2.1 per cent in the number of employees, of 5 per cent in the total amount paid in wages and of 2.8 per cent in the average weekly earnings was shown in March from un-weighted figures of 43 industries combined, when compared with February, according to the Bureau of Labor Statistics, Department of Labor. The report on employment in March is based on 5453 representative establishments in 43 manufacturing industries, covering 2,135,564 employees whose total earnings during one week amounted to \$54,538,778. Identical establishments in February reported \$2,092,285 employees and total payrolls of \$51,965,545. Increases in the number of employees were shown in 39 of the 43 industries, the largest (14.4 per cent) gain being in the fertilizer industry, followed by brick, with 8.1 per cent, and steel shipbuilding with 7.1 per cent.

The iron and steel industry showed an increase of 1.7 per cent in number of employees in 189 identical establishments in one week in March over one week in February, the total number of employees being 241,068 compared with 237,039. The increase in the payroll in March for the given week was 2.6 per cent, the weekly pay roll in March being \$6,870,026 as compared with the weekly pay roll in February of \$6,695,932.

When compared with the same month in 1922, the increase in employment in 117 iron and steel plants in March, 1923, was 34.2 per cent, the number of employees for March of this year being 163,056 as compared with 121,485 for the same month of last year. The increase in wages is much more impressive, amounting to 86.1 per cent, the weekly pay roll for March of this year being \$4,656,528, as compared with \$2,501,955 last year.

In comparing the per capita earnings in March, 1923, with those in February, 1923, the report credits the iron and steel industry with an increase of 0.9 per

cent. Dealing with full and part time operations in February, 1923, the report lists 123 iron and steel plants, of which 76 per cent were operating full time, 21 per cent were operating part time and 3 per cent were idle. Wage adjustments between Feb. 15 and March 15, 1923, in the iron and steel industry, according to the report, covered, 22 establishments, all of them representing increases in wages, the greatest of which was 16.7 per cent, applicable to one plant and representing 9 per cent of the total employees of that plant. The smallest increase in wages was 1.6 per cent, applicable to one plant and representing 43 per cent of the employees.

Figures for the principal metal working industries follow, with comparisons of March, 1923, with the preceding month and with the same month one year ago:

Periods	Number of Estab- lishments	Number of Men	Week's Payroll	Average Pay Envelope
<i>Iron and Steel</i>				
March, 1923.....	189	241,068	\$6,870,026	\$28.50
Feb., 1923.....	189	237,039	6,695,932	28.25
March, 1922*.....	117	121,485	2,501,955	20.60
<i>Automobiles</i>				
March, 1923.....	186	263,501	8,746,918	33.19
Feb., 1923.....	186	252,157	8,011,988	31.77
March, 1922*.....	46	96,983	745,206	28.31
<i>Car Building and Repairing</i>				
March, 1923.....	139	90,853	2,541,843	27.98
Feb., 1923.....	139	89,326	2,388,489	26.74
March, 1922*.....	54	39,383	1,062,197	26.97
<i>Foundry and Machine Shops</i>				
March, 1923.....	372	135,122	3,833,927	28.37
Feb., 1923.....	372	130,679	3,603,314	27.58
March, 1922*.....	(not reported)			
<i>Miscellaneous†</i>				
March, 1923.....	314	164,295	4,272,181	26.00
Feb., 1923.....	314	158,863	3,980,553	25.06
March, 1922*.....	(not reported)			
<i>Metal Workers (the five groups above)</i>				
March, 1923.....	1,200	894,839	26,264,895	29.35
Feb., 1923.....	1,200	868,054	24,680,276	28.43
March, 1922*.....	217	257,851	6,309,358	24.47

*As present reports cover many more plants, the March, 1922, figures are of interest only as indicating changes in wage rates.

†Agricultural implements, electrical apparatus, hardware, steel shipbuilding and stoves.

‡Includes only iron and steel, automobiles and car shops.

Foundrymen Visit Worthington Works

Members of the Newark Foundrymen's Association and of the Metropolitan section of the American Society of Mechanical Engineers were guests at the Worthington works of the Worthington Pump and Machinery Corporation, Harrison, N. J., April 24. The visit to this plant was the first of three sessions making up a joint meeting of the two organizations. A dinner and an evening meeting to be addressed by Dr. Richard Moldenke, consulting metallurgist, were to follow.

The main foundry, which pours 60 tons per day and produces large condenser shell and other heavy castings, was inspected. The machine foundry, in which small and medium size work is machine molded, adjoins the main foundry. Cut sand is delivered to the individual molding machines by conveyor from the floor below. The molder's floors are of grating and when molds are shaken out the sand drops through to the room below, where it is mixed and cut by machine and conveyed up to the molding machines. The method of handling iron, coke and other material, and the charging of the cupola were shown. This foundry pours 40 tons per day, and there is also a brass foundry of 8 tons per day capacity employing several oil-burning melting furnaces.

The three buildings, each 1000 ft. long, make up the machine shops. The galleries of these buildings are used for work on the smaller parts. Machinery operations are continuous, work being passed from machine to machine according to the sequence of operations. Castings are handled by overhead cranes, pillar cranes and by switch engines on broad gage track.

Fifteen guides were in charge of the visitors and arrangements in charge of Arthur B. Jennings, works manager of the company. The work at this plant includes the manufacture of large and small condensers

of various types; duplex, plunger and centrifugal pumps and meters. The plant, which employs from 1500 to 1800, is at present engaged to capacity, and the working of all departments, therefore, could be seen by the visitors.

Plans for Tariff Inquiry

WASHINGTON, April 24.—Final and permanent form of the questionnaire adopted by the Tariff Commission to be used in compiling cost figures of blast furnaces, both here and abroad, is being put into shape. The draft to be used in conducting this investigation, taken up under the flexible provision of the Fordney-McCumber act upon the application of Eastern merchant furnace interests, which are seeking to have the present rate of 75 per cent increased, has been determined upon after an inquiry made in the Philadelphia district among merchant furnace interests by F. Morton Leonard of the Tariff Commission. The form varies but little from that described in THE IRON AGE of last week. One of the principal decisions arrived at by the commission relates to the cost sheet. It will be the purpose of the commission to permit the furnace interests to have the option of using their own cost sheets as the form for presenting the figures, if they consider that the cost sheet of the Tariff Commission is too complicated.

It is expected that at a meeting this week the commission will map out definitely its entire program. The way for this has been opened as the result of a conference President Harding held with the Tariff Commission at the White House last Friday. At that conference, a program was considered for putting into effective operation the flexible provisions of the Fordney-McCumber tariff act.

Prices Finished Iron and Steel f.o.b. Pittsburgh

For additional prices, see page 1143

Plates	
Sheared, tank quality, base, per lb.	2.50c. to 2.75c.
Structural Material	
Beams, channels, etc.	2.50c. to 2.60c.
Sheet piling	2.65c. to 2.75c.
Iron and Steel Bars	
Soft steel bars, base, per lb.	2.40c. to 2.75c.
Refined iron bars, base, per lb.	3.25c.
Double refined iron bars, base per lb.	4.85c. to 5.00c.
Stay bolt iron bars, base, per lb.	8.00c. to 8.50c.
Hot-Rolled Flats	
Hoops, ordinary gages and widths, base, per lb.	3.30c. to 3.50c.
Hoops, light gage, under 1 in. wide.	3.75c.
Bands, base, per lb.	3.30c. to 3.50c.
Strips, base, per lb.	3.30c. to 3.50c.
Cotton ties	1.60c.
Cold-Finished Steels	
Bars and shafting, base, per lb.	3.00c. to 3.10c.
Strips, base, per lb.	5.25c. to 5.50c.

Wire Products	
Nails, base, per keg.	\$3.00
Galvanized nails, 1 in. and over.	\$2.25 over base
Galvanized nails, less than 1 in.	\$2.50 over base
Bright plain wire, base, No. 9 gage per 100 lb.	2.75
Annealed fence wire, base, per 100 lb.	2.90
Spring wire, base, per 100 lb.	3.70
Galvanized wire, No. 9, base, per 100 lb.	3.35
Galvanized barbed, base, per 100 lb.	3.80
Galvanized staples, base, per keg.	3.80
Painted barbed wire, base, per 100 lb.	3.45
Polished staples, base, per keg.	3.45
Cement coated nails, base, per count keg.	2.70
Woven fence, carloads (to jobbers) 67½ to 66½ per cent off list	
Woven fence, carloads (to retailers) .65 to 64 per cent off list	
Bolts and Nuts	
Machine bolts, small, rolled threads.	50 per cent off list
Machine bolts, small, cut threads.	40 and 10 per cent off list
Machine bolts, larger and longer.	40 and 10 per cent off list
Carriage bolts, ¾ x 6 in.	
Smaller and shorter, rolled threads.	45 per cent off list
Cut threads	40 per cent off list
Longer and larger sizes	40 per cent off list
Lag bolts	50 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.	40 and 10 per cent off list
Other style heads	20 per cent extra
Machine bolts, c.p.c. and t. nuts, ¾ x 4 in.	
Smaller and shorter	35 and 5 per cent off list
Larger and longer sizes	35 and 5 per cent off list
Hot pressed square or hex. nuts, blank.	\$3.00 off list
Hot pressed nuts, tapped	2.75 off list
C.p.c. and t. square or hex. nuts, blank.	3.00 off list
C.p.c. and t. square or hex. nuts, tapped.	2.75 off list
Semi-finished hex. nuts:	
¾ in. and smaller, U. S. S.	.75 and 5 per cent off list
¾ in. and larger, U. S. S.	.70 and 2½ per cent off list
Small sizes, S. A. E.	.75, 10 and 5 per cent off list
S. A. E. ¾ in. and larger.	.75, 10 and 2½ per cent off list
Stove bolts in packages.	.75, 10, 5 and 2½ per cent off list
Stove bolts in bulk.	.75, 10, 5 and 2½ per cent off list
Tire bolts	.50, 10 and 10 per cent off list

Cap and Set Screws	
Milled square and hex. head cap screws.	70 and 10 per cent off list
Milled set screws.	70 and 10 per cent off list
Upset cap screws.	75 per cent off list
Upset set screws.	75 per cent off list
Rivets	
Large structural and ship rivets, base, per 100 lb.	\$3.25 to \$3.50
Large boiler rivets, base, per 100 lb.	3.35 to 3.60
Small rivets	60 and 10 to 60 and 5 off list
Track Equipment	
Spikes, ¾ in. and larger, base, per 100 lb.	\$3.15
Spikes, ½ in. ¾ in. and ¾ in., per 100 lb.	3.75
Spikes, ¾ in.	3.75
Spikes, boat and barge, base, per 100 lb.	\$3.50 to 3.75
Track bolts, ¾ in. and larger, base, per 100 lb.	4.25 to 4.50
Track bolts, ½ in. and ¾ in., base, per 100 lb.	5.50
Tie plates, per 100 lb.	2.55 to 2.60
Angle bars, base, per 100 lb.	2.75
Welded Pipe	
Butt Weld	
Inches	Steel
1/4	45
1/4 to 3/8	51
1/2	56
3/4	60
1 to 3	62
Inches	Iron
1/4 to 3/8	+11
1/2	22
3/4	28
1 to 1 1/2	30
Inches	Galv.
1/4	+39
1/2	2
3/4	11
1 to 1 1/2	13

Lap Weld	
2	55
2 1/2 to 6	59
7 and 8	56
9 and 10	54
11 and 12	53
43 1/2	23
47 1/2	26
43 1/2	28
41 1/2	26
40 1/2	11
Butt Weld, extra strong, plain ends	
1/4	41
1/4 to 3/8	47
1/2	53
3/4	58
1 to 1 1/2	60
2 to 3	61
24 1/2	23
30 1/2	21
42 1/2	28
47 1/2	30
49 1/2	14
50 1/2	
Lap Weld, extra strong, plain ends	
2	53
2 1/2 to 4	57
4 1/2 to 6	56
7 and 8	52
9 and 10	45
11 and 12	44
42 1/2	23
46 1/2	29
45 1/2	15
47 1/2	28
39 1/2	21
32 1/2	16
31 1/2	2

To the large jobbing trade the above discounts are increased by one point, with supplementary discount of 5 per cent on black and 1½ points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes	
Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in.	27
2 1/4 to 2 1/2 in.	37
3 in.	40
3 1/4 to 3 1/2 in.	42 1/2
4 to 13 in.	46
1 1/2 in.	+18
1 3/4 to 1 1/2 in.	+8
2 to 2 1/4 in.	2
2 1/4 to 3 in.	7
3 1/4 to 4 1/2 in.	9

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes
Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.	32
1¼ and 1½ in.	47	3 and 3¼ in.	39
1¾ in.	31	3½ and 3¾ in.	39
2 and 2¼ in.	22	4 in.	41
		4½ in. and 5 in.	33
Hot Rolled			
3 and 3¼ in.	38	3¼ in. and 3¾ in.	39
		4 in.	43

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing
Carbon under 0.30, base.83 per cent off list
Carbon 0.30 to 0.40, base.81 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes	
Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage.	15
2-in. O.D. 11 gage.	16
2-in. O.D. 10 gage.	17
2 1/4-in. O.D. 12 gage.	17
2 1/4-in. O.D. 11 gage.	18
2 1/4-in. O.D. 10 gage.	20
3-in. O.D. 7 gage.	35
1 1/2-in. O.D. 9 gage.	15
5 1/2-in. O.D. 9 gage.	55
5 1/2-in. O.D. 9 gage.	57

Tin Plate
Standard cokes, per base box. \$4.95 to \$6.00

Terne Plate	
(Per package, 20 x 28 in.)	
8-lb. coating, per 100	\$9.90
10-lb. coating I. C.	13.80
12-lb. coating I. C.	15.10
14-lb. coating I. C.	16.25
16-lb. coating I. C.	17.25
18-lb. coating I. C.	18.25

Sheets	
Blue Annealed	
Nos. 9 and 10 (base), per lb.	2.65 to 3.35c.
Box Annealed, One Pass Cold Rolled	
No. 28 (base), per lb.	3.50c. to 4.25c.

Automobile Sheets
Regular auto body sheets, base (22 gage), per lb.
5.00c. to 6.50c.

Galvanized
No. 28 (base), per lb. 5.00c. to 5.75c.

Long Ternes
No. 28 gage (base), 8-lb. coating, per lb. 4.95c.

Tin-Mill Black Plate
No. 28 (base), per lb. 3.50c. to 4.00c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	\$0.32	Buffalo	\$0.26	St. Louis	\$0.43	Pacific Coast	\$1.50
Philadelphia, export.	0.235	Cleveland	0.21	Kansas City	0.735	Pac. Coast, ship plates	1.20
Baltimore, domestic.	0.31	Cleveland, Youngstown		Kansas City (pipe)	0.705	Birmingham	0.69
Baltimore, export.	0.225	Comb.	0.19	St. Paul	0.60	Memphis	0.385
New York, domestic.	0.34	Detroit	0.29	Omaha	0.735	Jacksonville, all rail.	0.50
New York, export.	0.255	Cincinnati	0.29	Omaha (pipe)	0.705	Jacksonville, rail and	
Boston, domestic.	0.365	Indianapolis	0.31	Denver	1.27	water	0.415
Boston, export.	0.255	Chicago	0.34	Denver (pipe)	1.215	New Orleans	0.515

The minimum carload to most of the foregoing points is 26,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 30c. to 40c.; sheets and tin plates, 30c. to 40c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 49c.; pipes not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Messabi Bessemer, 55 per cent iron.....	6.20
Messabi non-Bessemer, 51½ per cent iron.....	5.55

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	12c.
Iron ore, Swedish, average 66 per cent iron.....	9.5c. to 10c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus.....	45½c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	43½c.
Manganese ore, Brazilian or Indian.....	45c.
Tungsten ore, per unit, in 60 per cent concentrates.....	\$8.50
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, per ton.....	\$120.00 to \$125.00
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	120.00 to 125.00
Spiegeleisen, foreign, 19 to 21 per cent, seaboard, per ton.....	45.00 to 55.00
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton, nominal.....	39.00
Ferrosilicon, 50 per cent, delivered per gross ton.....	92.50 to 95.00
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace.....	48.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace.....	51.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace.....	55.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace.....	59.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace.....	64.10
Silvery iron, 6 per cent, per ton, furnace.....	37.00
Silvery iron, 7 per cent, per ton, furnace.....	38.00
Silvery iron, 8 per cent, per ton, furnace.....	39.50
Silvery iron, 9 per cent, per ton, furnace.....	41.50
Silvery iron, 10 per cent, per ton, furnace.....	43.50
Silvery iron, 11 per cent, per ton, furnace.....	46.80
Silvery iron, 12 per cent, per ton, furnace.....	50.10
Ferrotungsten, per lb. contained metal.....	88c. to 90c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....	11.50c. to 12c.
Ferrovanadium, per lb. contained vanadium.....	\$3.50 to \$4.00
Ferrocobaltititanium, 15 to 18 per cent, per net ton.....	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica per net ton f.o.b. Illinois and Kentucky mines.....	\$20.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica per net ton, f.o.b. Illinois and Kentucky mines.....	21.50
Per 1000 f.o.b. works:	
Fire Clay:	
Pennsylvania.....	\$48.00 to \$51.00
Ohio.....	45.00 to 47.00
Kentucky.....	45.00 to 47.00
Illinois.....	48.00 to 50.00
Missouri.....	48.00 to 50.00
Ground fire clay, per net ton.....	6.50 to 9.50
Silica Brick:	
Pennsylvania.....	47.00
Chicago.....	52.00
Birmingham.....	48.00
Ground silica clay, per net ton.....	10.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	50.00

Research on Alabama Iron Ores

The School of Mines of the College of Engineering, University of Alabama, at University, Ala., announces five fellowships in mining and metallurgical research in cooperation with the United States Bureau of Mines. The fellowships are open to graduates of universities and engineering schools who have qualifications to undertake research investigation. The value of each is \$540 per year of nine months beginning Sept. 1. The fellowships have been established for the purpose of undertaking the solution of mining and metallurgical problems of special importance to the State of Alabama

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$45.00 to \$46.00
Rolling billets, 2-in. and under.....	45.00 to 46.00
Forging billets, ordinary carbons.....	55.00 to 58.00
Sheet bars, Bessemer.....	45.00 to 46.00
Sheet bars, open-hearth.....	45.00 to 46.00
Slabs.....	45.00 to 46.00
Wire rods, common soft, base, No. 5 to ¼-in.....	51.00 to 55.00
Wire rods, common soft, coarser than ¼-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5 per ton over base
Wire rods, carbon 0.20 to 0.40.....	\$3 per ton over base
Wire rods, carbon 0.41 to 0.55.....	\$5 per ton over base
Wire rods, carbon 0.56 to 0.75.....	\$7.50 per ton over base
Wire rods, carbon over 0.75.....	\$10 per ton over base
Wire rods, acid.....	\$15 per ton over base
Skelp, grooved, per lb.....	2.50c. to 2.80c.
Skelp, sheared, per lb.....	2.50c. to 2.80c.
Skelp, universal, per lb.....	2.50c. to 2.80c.

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, per lb.....	2.25c.
Rails, light, rerolled, base, per lb.....	2.25c.
Spikes, ⅝-in. and larger, base, per 100 lb.....	\$3.15
Spikes, ½-in., ⅝-in. and ¾-in., base, per 100 lb.....	\$3.25 to 3.75
Spikes, ⅝-in., base, per 100 lb.....	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.....	3.50 to 3.75
Track bolts, ¾-in. and smaller, base, per 100 lb.....	4.25 to 5.50
Track bolts, ¾-in. and larger, base, per 100 lb.....	4.25 to 4.50
Tie plates, per 100 lb.....	2.55 to 2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb.....	2.50c. to 2.60c.
Bars, rail, steel reinforcing, base, per lb.....	2.15c. to 2.25c.
Ground shafting, base, per lb.....	3.40c.
Cut nails, base, per keg.....	\$3.40

Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100 (½% Nickel, 10 to 20 per cent Carbon)...	\$3.75
2300 (¾% Nickel).....	5.75
2500 (5% Nickel).....	8.25
3100 (Nickel Chromium).....	4.75
3200 (Nickel Chromium).....	6.50
3300 (Nickel Chromium).....	8.75
3400 (Nickel Chromium).....	7.75
5100 (Chromium Steel).....	4.25
5200 (Chromium Steel).....	8.50
6100 (Chromium Vanadium bars).....	5.25
6100 (Chromium Vanadium spring steel).....	5.00
9250 (Silico Manganese spring steel).....	4.25
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.75
Chromium Molybdenum bars (0.70-1 Chromium, 0.25-0.40 Molybdenum).....	5.25
Chromium Molybdenum spring steel (0.50-0.70 Chromium, 0.15-0.25 Molybdenum).....	5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100-lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq. the net ton bar price applies.

and the Southern States. The following problems have been selected for investigation for the year 1923-1924: 1—Beneficiation of iron ores—(a) high silica iron ores, (b) brown iron ores, (c) gray iron ores (partly magnetic); 2—Coal washing.

Dr. Clifford B. Connelley, director of industrial relations at Carnegie Institute of Technology, was the speaker at the April meeting of the Pittsburgh Foundrymen's Association, Monday evening, April 16. His subject was "The Journeyman Molder; Why?"

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
	Lake	Electro-lytic*	New York	New York	St. Louis	New York	St. Louis
April 18.....	17.00	16.75	44.75	8.00	7.90	7.65	7.30
19.....	17.00	16.75	44.55	8.00	7.90	7.55	7.20
20.....	17.00	16.62½	44.25	8.00	7.90	7.50	7.15
21.....	17.00	16.62½	....	8.00	7.90	7.45	7.10
23.....	17.00	16.75	44.87½	8.00	7.90	7.45	7.10
24.....	17.00	16.75	45.62½	8.00	7.90	7.40	7.05

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, April 24.

Demand for most of the metals is so light that quotations in some cases are nominal. Buying of copper does not materialize but prices are fairly steady. There has been an active speculative demand for Straits tin. Offerings of foreign lead have depressed the market and quotations are lower. The zinc market continues to decline with buying very light.

Copper.—The market for electrolytic copper continues extremely inactive. At one time during the week there was considerable inquiry from consumers, but this turned out to be merely an attempt to test the market. There was also fairly active buying by France and Germany, but export demand has also quieted down. While it is still possible to shade the market quotation a little, it is generally admitted that if a consumer were in the market for a large quantity of copper it could not be bought at less than 17c., delivered, which is largely nominal. There have been a few sales as low as 16.87½c., delivered, but there appears to be very little more available at this price. Evidently intimations by some producers that 17c. could be shaded \$1 or \$2 a ton have restrained consumers from actual buying for the present. It is stated that melters' needs are not covered much beyond early July and therefore, if business continues good, a wave of copper buying must develop. Lake copper is quoted at 17c., delivered.

Tin.—For four days last week, April 17 to 20 inclusive, the market here was quite active. Total sales are estimated to have been about 2000 tons, or an average of about 500 tons per day. Nearly all the business was between dealers and much of it was transacted on the New York Metal Exchange. For example, 275 tons were sold on the exchange on April 18, 185 tons on the 19th and 275 tons on the 20th. The feature of the market, however, is the fact that consumers still show no interest. They are apparently well covered, despite the heavy consumption, and have been largely out of the market for the last six or eight weeks. The only other news feature has been the announcement that the Williams-Harvey Co. of Brooklyn is to shut down its electrolytic tin refining plant. The appearance on the market of large quantities of Chinese tin has been a factor. Yesterday there was a sharp rise in the London market and transactions here quieted down, not even dealers being interested. Today London prices are reported as £215, 15s. for both spot and future standard tin and £222, 15s. for spot Straits tin, all about £4 per ton higher than a week ago. The spread, however, between spot standard and spot Straits of £10 per ton a week ago has fallen to £7. Arrivals thus far this month have been 6145 tons, with 5338 tons reported afloat. Spot Straits tin is quoted today at 45.62½c., New York, with the market dull.

Lead.—A sharp decline in the market has been registered and lead is quoted for May shipment at 8c., New York, by both the leading interest and the independents and at 7.90c., St. Louis. On April 19 the American Smelting & Refining Co. dropped its price from 8.25c. to 8c., New York. The day before this, however, there had been free offerings of foreign lead at 8c., New York, duty paid, which, with freight added to interior points, made it possible to sell below the

price of the leading interest. These offerings are assigned as the principal cause for the fall in the market. The opinion is expressed that the market may go to 7.75c., New York, at which level considerable buying should develop.

Zinc.—The decline in this market for prime Western has been sharper than that of any of the metals and today, for early or May shipment, it is quoted at 7.05c. to 7.10c., St. Louis, or 7.40c. to 7.45c., New York. Demand is exceedingly light and prospects for an increase in consumption equal to the augmented production are not bright. The demand for export, which has been counted on to increase, has not materialized and the prospects for this also are not encouraging. A curtailment of production is not an improbability, if present conditions continue.

Nickel.—Quotations for shot and ingot nickel are unchanged at 29c. to 32c. and electrolytic nickel is held at 32c. by the leading producers. Shot and ingot nickel in the outside spot market are quoted at 29c. to 32c.

Antimony.—Wholesale lots of Chinese metal for early delivery are quoted at 8c. per lb., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by importers who are able to obtain prices for the foreign product at 26.50c. per lb., New York, duty paid. The leading domestic producer does not make public any quotations. A sale of 80 tons of foreign 99 per cent aluminum was recently made at 28c. per lb., New York, duty paid.

Chicago

APRIL 24.—All of the metals except copper have declined and what little buying of copper there is covers second hand material which is moving at less than the prices to which producers are holding. A reduction of 25c. by the leading producer of lead has accentuated the weakness of that metal. Declining prices have stopped practically all buying except for immediate shipment. The current melt of all metals is large, however, and a resumption of purchases on a broad scale is expected as soon as prices stabilize. We quote, in carload lots, lake copper, 17.25c.; tin, 47c.; lead, 8c.; spelter, 7.20c.; antimony, 10c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 13.75c.; copper bottoms, 12c.; red brass, 11.25c.; yellow brass, 8.50c.; lead pipe, 6.50c.; zinc, 4.75c.; pewter, No. 1, 29c. tin foil, 33c. block tin, 38c., all buying prices for less than carload lots.

Labor Shortage an Important Factor in Mahoning Valley

YOUNGSTOWN, April 24.—Steel and labor shortages continue as dominant influences in the current situation, with production retarded in consequence. Most sheet plants are operating short-handed, with one or two mills in a complement usually idle because of lack of skilled operatives. Twenty laborers employed in the tube department of a district independent quit one day during the week, because they were able to secure outside employment at a higher wage rate. Much colored labor has been imported into the district from the South, though such importations have been checked for the time being because of higher labor rates paid by Southern employers.

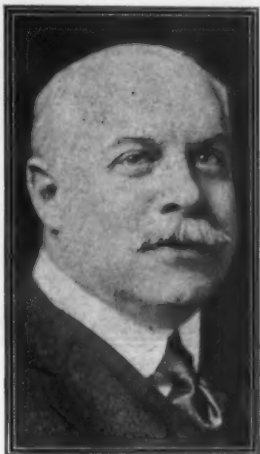
Due to inability to secure adequate steel bar shipments, one fabricating interest, with orders sufficient to run 100 per cent, has been obliged to cut its operations to 50 per cent. There are no evidences as yet of over-production and slowing down of the mills.

A merchant stack in the Shenango Valley, operated by the Reliance Coke & Furnace Co., was scheduled to go in blast during the week, thereby increasing the number of active blast furnaces in the Youngstown district to 40, of 46. Another merchant furnace at Leetonia has been ordered in blast and is under preparation. The stack at Struthers, Mahoning County, operated by the Struthers Furnace Co., is down for relining and will not be blown in under 30 days.

PERSONAL

Dr. George K. Burgess Appointed Director of Bureau of Standards

WASHINGTON, April 24.—Dr. George K. Burgess, chief of the Division of Metallurgy, Bureau of Standards, well known in the iron and steel and allied industries, was appointed last Saturday by President Harding as director of the bureau, succeeding Dr. S. W. Stratton, who now is president of the Massachusetts Institute of Technology. It has not been indicated who will be named as successor to Dr. Burgess as head of the metallurgical division.



DR. GEORGE K. BURGESS

Dr. Burgess was selected as head of the bureau by recess appointment and assumed his new position immediately. His appointment was recommended to Secretary of Commerce Herbert Hoover by the Board of Visitors of the bureau, consisting of Dr. Stratton, Dr. Ambrose Swasey, John R. Freeman, Fred W. McNair and Prof. Wilder D. Bancroft, together with several scientific societies. Societies to which Dr. Burgess belongs include the American Society for Testing Materials, of which he is president; the National Academy of Sciences, the American Society for Steel Treating, the American Institute of Mining and Metallurgical Engineers, the Iron and Steel Institute (Great Britain) and the Washington Academy of Sciences.

The new director of the bureau was graduated from the Massachusetts Institute of Technology in 1896, has been associated with the bureau since 1903, and is recognized as being well qualified for his new position because of his extensive understanding in the field of sciences and his intensive research work, much of it in iron and steel.

Dr. Burgess was born in Newton, Mass., in 1874, received his early education in his native State, and received his first degree from the Massachusetts Institute of Technology, where he was instructor in physics for two years after his graduation. Going to Paris, he completed graduate work and received the degree of doctor of sciences from the University of Paris. Upon his return to the United States he became instructor at the University of Michigan for one year and at the University of California for two years, after which he went to Washington in 1903 and entered the Bureau of Standards, where he was placed in charge of pyrometry. Out of this grew the Division of Metallurgy, which was established in 1913, with Dr. Burgess in charge and the only man in the division, which now has a personnel of 53.

Dr. Burgess also is chairman of the Board of Federal Specifications of the Bureau of the Budget, which has charge of preparing specifications for materials purchased by the Government, and is a member of the National Research Council. He represents the Department of Commerce on the American Engineering Standards Committee, dealing with the preparation of standards of engineering materials and practices.

W. M. Myers has been appointed works manager of the Bucyrus Co., South Milwaukee, Wis. Mr. Myers was born in Richmond, Va. He has been connected with the American Locomotive Co., the Baldwin Locomotive Works and the Lima Locomotive Works. He resigned from the Lima company to accept a commission as an

officer in the Ordnance Department of the United States Army in 1917 and, after the close of the war, he was commissioned in the Ordnance Department of the regular United States Army and was stationed at the Watertown Arsenal, Watertown, Mass.

N. F. F. Russell, formerly vice-president of the United States Cast Iron Pipe & Foundry Co., Burlington, N. J., has been elected president of the company, succeeding L. R. LeMoine, who has been made chairman of the board of directors. Two new directors have also been elected: H. Vinton Overholt, who takes the place of his father, the late A. C. Overholt and Frank M. Tait, the district representative at Dayton, Ohio. The other officers are the same: W. T. C. Carpenter continues as first vice-president; D. C. Hopkins, vice-president; B. F. Haughton, vice-president and treasurer, and Charles R. Rauth, secretary and assistant treasurer.

Frank A. Drury, president Merchants National Bank, Worcester, Mass., has been made treasurer of the Wickwire Spencer Steel Corporation, to succeed Frank Kilmer, resigned. George F. Naphen, New York, R. B. Young, Boston, and C. K. Anderson, Chicago, are directors, succeeding H. T. Ramsdell, Buffalo, Frank Kilmer and Jerome R. George, Worcester, resigned. The personnel otherwise remains unchanged.

Oliver O. Brace has been elected president and general manager of the Bay View Foundry Co., Sandusky, Ohio, succeeding E. Lea Marsh, who resigned to become treasurer of another cement company in Chicago. Chester T. Teasel has succeeded Frederick Harten as secretary and treasurer.

A. G. Hopcraft, purchasing agent of the Ferro Machine & Foundry Co., has been re-elected president of the Cleveland Purchasing Agents Association, Cleveland. He was also chosen a national director for two years and was presented with a gold watch by the members for aiding in bringing the national convention to Cleveland this year. W. L. Bosley of the Peck, Stow & Wilcox Co. was elected secretary, and H. U. Cowell, Lamson & Sessions Co., treasurer.

George B. Hansen, formerly superintendent of the Columbus, Ohio, blast furnaces of the American Rolling Mill Co., has been appointed general superintendent of the Ashland, Ky., works of the company, succeeding Charles R. Peebles, resigned. J. H. Ferguson, superintendent of the Ashland blast furnaces, has been promoted to superintendent of the Columbus furnaces.

Wm. Best, Jr., has resigned as district sales manager of the Jones & Laughlin Steel Corporation in charge of the San Francisco office, which position he has held for the last 19 years, to engage in business on his own account. His successor has not yet been appointed, but C. P. Hensley is acting manager.

H. H. Pleasance, of the sales division, of the United Alloy Steel Corporation, Canton, Ohio, and H. C. Thomas, of the operating division, were elected vice-presidents at the annual meeting. The old officers were reelected.

Ralph W. Clark, New York district sales manager, Pilling & Co., has returned from a trip to England and France.

William G. Sharp, who recently resigned as general manager of the Marting Iron & Steel Co., Ironton, Ohio, has been appointed vice-president and general manager of the Wellston Iron Furnace Co., Jackson, Ohio, which owns and operates two blast furnaces at Wellston, Ohio. He succeeds Joseph Harding, who has taken charge of the Superior Portland Cement Co.'s properties.

Henry S. Darby, president J. M. Warren & Co., Troy, N. Y., was guest of honor at a dinner given last week by employees of the company to celebrate the fiftieth anniversary of his first connection with the organization as a clerk. Sixty-five officers and employees attended and presented Mr. Darby a set of books. At the time of incorporation of the company 14 years after

he joined it, he was elected treasurer and became president in 1914.

George H. Jones, who, as announced in THE IRON AGE last week, has been appointed assistant general manager of sales, for the Pittsburgh Steel Co., has been affiliated with that company since the latter part of 1908, and his experience is such as to fit him well for his new duties. For two years he traveled for the company in New York State, selling fence to the retail trade. Then for a period of three years he was stationed in Pittsburgh as assistant manager of the fence department. This was followed by five years as assistant manager of the New York office, which included a period of 10 months in Washington as manager of the office which the company maintained there during the



GEORGE H. JONES

war. On June 1, 1919, he was appointed Chicago district manager of sales, and from that position he advances to the new one. Mr. Jones was born in Wales, but came to this country with his parents when a boy of 13 years and grew up on a farm in Northeastern Pennsylvania on which his folks located. He is a member of the Ouillmette Country Club and the Illinois Athletic Club of Chicago.

William F. Dunker, for 23 years associated with the Stacey Mfg. Co., Cincinnati, and for the last 12 years its secretary and treasurer, has severed his connection with that company. He is organizing the William F. Dunker Engineering & Sales Co., and will shortly open an office in Cincinnati, handling tanks, electric steel castings, pumps, compressors and kindred products. Temporary offices will be maintained at his residence, 212 Woolper Avenue, Clifton, Cincinnati.

De Witt Page, president and general manager New Departure Mfg. Co., Anderson, Ind., has been elected a vice-president of the General Motors Corporation. All officers of the corporation were re-elected at directors' meeting held April 19.

R. J. Smith, formerly with J. H. Williams & Co., Brooklyn, N. Y., has joined the Western Drop Forge Co., Marion, Ind., and will have general supervision of a department devoted to the manufacture of drop forged specialties and tools.

W. M. Meyers, formerly assistant President W. W. Coleman, of the Bucyrus Co., South Milwaukee, Wis., has been appointed works manager.

T. E. Coleman, vice-president and general manager Madison-Kipp Corporation, Madison, Wis., manufacturer of lubricating devices, has returned from an extended business and investigating trip of Canadian and British markets.

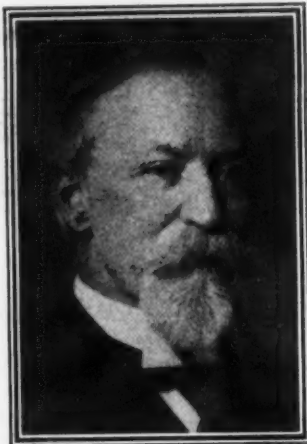
David F. Mann has been appointed manager of the Chicago office, Pittsburgh Steel Co., succeeding George W. Jones, who goes to Pittsburgh as assistant general manager of sales. Mr. Mann has been associated with the Pittsburgh Steel Co. for about ten years, during the last five of which he has been sales agent of the company, attached to the home offices at Pittsburgh.

Harry S. Smith, identified with Jos. T. Ryerson & Sons, Chicago, for several years and more recently with the General American Tank Car Corporation, has been placed in charge of the newly established Chicago office of the Poldi Steel Corporation of America. Herbert Moore, for 16 years with the Crucible Steel Co. of America, and later with the Latrobe Electric Steel Co., will also be with the new office, which is in the First National Bank Building.

OBITUARY

JAMES LORD, president American Iron & Steel Mfg. Co., Lebanon, Pa., for 10 years previous to its acquisition in 1917 by the Bethlehem Steel Corporation, died April 22, in his 79th year.

He was born in Camden, Del., in 1844 and was educated at St. John's College, Annapolis, Md. For 10 years following 1872, he was employed at the Reading Bolt & Nut Works, later becoming general manager of the Pennsylvania Bolt & Nut Co. He remained in this connection until September, 1899, when he became general manager of the American Iron & Steel Mfg. Co., which was organized at that time to combine the activities of several bolt, nut and rivet makers with plants at Lebanon and Reading, Pa. Among the companies acquired was the Pennsylvania Bolt & Nut Co. In 1907 he became president. Mr. Lord also had been a director of the Lebanon Trust Co. and had served in the Civil War with the Army of Southeastern Virginia, first as second lieutenant, later as captain of Independent Company, Maryland Cavalry.



JAMES LORD

WILLIAM BRADY, chief chemist, South Works, Illinois Steel Co., Chicago, died of heart failure at his home in that city, April 22. He was born Oct. 28, 1863, and first entered the employ of the Illinois Steel Co. in 1889. He had been chief chemist since 1900.

JOHN GILBERT WARD, treasurer, Babcock & Wilcox Co. for more than 30 years, died at his home at Glen Ridge, N. J., on April 22. He was a native of Cuba, coming to this country as a boy. In 1888 he went with the Babcock & Wilcox Co. as a clerk and was made treasurer five years later.

CHARLES E. WILLIAMS, president C. E. Williams Mfg. Co., manufacturer of screw products, 540 West Jackson Boulevard, Chicago, died in that city on April 14, at the age of 70.

P. C. PETERSON, general superintendent W. A. Jones Foundry & Machine Co., Chicago, for the last 20 years, died on April 14. He was born at Frieichen, Sweden, in 1859 and had been connected with the Jones company since its inception in 1890. Mr. Peterson was a practical molder of the old school, having made a specialty of pulley, gear, sprocket, flywheel molding and the like.

I. REYNOLDS ADRIANCE, one of the founders of the Adriance Co., maker of machinery, died on April 16 at his home, Endencourt, in Poughkeepsie, N. Y., aged 73 years.

MONTGOMERY C. TOWNLEY, Jackson, Mich., who died a few days ago in his 65th year, was at the time of his death president of the Walcott Lathe Co. and the Night Commander Lighting Co.; vice-president of the Frost Gear & Forge Co., the Hi-Power Tool Co., and the Jackson Shaper Corporation.

SCHUYLER S. WHEELER, president of the Crocker-Wheeler Co., Ampere, N. J., died in his home at 755 Park Avenue, New York, on April 20, aged 63 years. He was born in New York and early joined the engineering staff of Thomas A. Edison, having had charge of the first Edison station begun in 1883. Between that time and 1888, when he organized the Crocker-Wheeler Co., Mr. Wheeler was active in several electrical companies and perfected a number of important inventions.

Foundry Week at Cleveland

American Foundrymen's Annual Convention, April 30 to May 3, Offers a Voluminous Exhibition and High Grade Technical Program

IN a city which ranks high both as a foundry and steel center, the stage is all set for the annual convention and exhibition of the American Foundrymen's Association next week in Cleveland. With fresh memories of the excellent record set by the last convention at Rochester, N. Y., in June, last year, this year's achievement is prophesied to surpass any other. The present industrial activity of the country should be a partial guarantee of the convention's success.

The city's new auditorium is to house the entire

affair. Contrary to arrangements at previous conventions, the exhibition opens on a Saturday, or April 28, and closes Thursday, May 3. The technical programs are scheduled for the first four days of the week, April 30 to May 4. The entire gathering will therefore close a day or so earlier than on former occasions.

The international character of the convention, which was initiated at the Columbus, Ohio, convention in 1920 and so successfully continued at Rochester last year, will also be a feature this year.

Great Variety of Products Will Be Shown by Exhibitors

A

AIR REDUCTION SALES CO., New York. Specially designed machines for automatic oxyacetylene cutting, comprising the Radiagraph, for straight line and circular cutting of steel plates and forgings; the Oxygraph, for cutting forgings, dies and shapes, and the Camograph, for production of gear teeth and specially designed shapes; also a demonstration of the use of the Aircodavis-Bournonville hand-welding and cutting torches on gray iron and steel castings. Represented by J. L. Anderson, manager industrial engineering service department; F. E. Rogers, Alex. Blaser, C. E. Hobbs and G. Van Alstyne.

AJAX METAL CO., Philadelphia. Ajax-Wyatt electric furnace, Ajax-Northrup furnace, Ajax process brass and bronze ingots and Ajax white metals. Represented by G. H. Clamer, first vice-president and general manager; W. J. Coane, second vice-president and sales manager; C. F. Hopkins, works manager; F. M. Willeson, manager Boston office; Zeno D. Barnes, manager Cleveland office; D. H. Fairfield and Henry Gieseke, electric furnace representatives.

ALBANY SAND & SUPPLY CO., Albany, N. Y. Reception booth with a few samples of company's principal product, molding sand.

AMERICAN FOUNDRY EQUIPMENT CO., New York. American sand blast room with new down-draft system of ventilation in which the air enters through the roof and is exhausted through the floor, room being equipped with new pedestal-type rotary table; sand-cutting machines of two types, type K for the large sand heaps and type HP for light heaps; sand blast pressure tank, cloth screen dust arrester, No. 611 jolt, roll-over squeeze, pattern draw molding machine, a hand operated machine; miscellaneous exhibit of snap flasks, jackets, pattern frames, mounting compound, flask bars; American hammer core machine and accessories. Represented by V. E. Minich, president; E. A. Rich, vice-president; H. H. Haley, second vice-president; R. H. Kelley, advertising manager; James Rigby, Jr., sales manager; C. D. Steinmeier, manager York factory; J. E. Sweet, J. D. Alexander, C. B. Schneible, C. G. Smith, F. A. Smith, E. J. Turnbull, S. H. Baird, R. H. Moore, David Logan and P. S. Weiner.

AMERICAN HOMINY CO., Chicago. Samples of Ajax dry core and facing binder and Homco core oil, together with cores and castings made with these products. Represented by D. O. Green, sales manager, specialty department; R. H. Mills, official representative; W. H. Albhorn, manager service department; John A. Green and A. N. Duncan, field representatives.

ARCADY MFG. CO., Freeport, Ill. No. 110 jolt modern machine, No. 11 modern molding machine, No. 71 post jolt squeezer, No. 81 portable jolt squeezer, 3-in. core jolt, 6-in. jolter center strip, Brillion pouring outfit and sample castings. Represented by L. L. Munn, vice-president and general manager; Henry Tscherning, chief engineer; Mentor Wheat, August Christen, G. D. Wolfiev, R. E. Turnbull and J. A. Morgan, salesmen.

AREX CO., Chicago. Working demonstration of the siphonage principle of ventilation for foundries, showing how it pulls out the smoke. Represented by George H. Pelton, secretary; E. F. Carr, Pittsburgh manager; Henry L. Foote, Cleveland manager; Thomas Batdorf and H. I. Thomas, Cleveland office.

ARMSTRONG-BLUM MFG. CO., Chicago. Marvel metal band saw, automatic high-speed saw, portable motor-driven shop saws, rod cutters (for core rods), etc. Represented by Harry J. Blum, secretary, and George J. Blum, vice-president.

ASBURY GRAPHITE MILLS, Asbury, N. J. Graphite for every use, both crude and refined. Represented by Jonathan Bartley, E. H. Thompson, I. D. Adams and H. M. Riddle, Jr.

E. C. ATKINS & CO., Indianapolis, Ind. Hand, rip and panel saws, circular and band saws, saw blades and frames, metal-cutting hack-saw machines, screw slotting saws, metal-cutting circular saws of all kinds, metal band-saw machines and blades, foundry pattern and flask plates, machine knives of various kinds used in pattern shops of foundries, and belt wax. Represented by T. A. Carroll, manager of advertising and sales promotion; E. S. Norvell, manager of metal-cutting department; B. D.

Thompson, metal-cutting specialist; A. Mertz, general salesman; Everett Green, superintendent metal-cutting machine department.

AUSTIN CO., Cleveland. Photographs and construction data for foundries and minute sketches of foundry layouts, as well as typical construction details. Represented by G. A. Bryant, manager of sales; O. D. Conover, in charge of exhibits; H. E. Stitt, chief engineer; C. F. Chard, district sales manager; H. L. Cornelson, sales engineer; R. E. Ward, manager material sales division; A. H. Meyer, advertising.

AUTOMATIC TRANSPORTATION CO., Buffalo, N. Y. Type "LA" elevating platform truck, type "TA" three-wheel tractor and type "T-L" tiering lifting truck. Represented by R. J. Mulholland, assistant to the vice-president, assisted by O. H. Goodsell, Western New York representative; T. F. Donahue, Chicago; G. F. Simons, Cincinnati; H. D. Gumpfer, Detroit.

B

BACHARACH INDUSTRIAL INSTRUMENT CO., Pittsburgh. Introducing a number of new devices for the foundry, including an instrument which has been called the Ardrometer, which measures high temperatures without itself being exposed to the direct action of the flames or hot gases; also several improved types of Thermo electric pyrometers of the Siemens and Halske types; also a new design of a draft gage and the Bacharach P. V. recorder, which was first shown at last year's convention of the American Foundrymen's Association, and which has since been adopted for use in a considerable number of plants. Represented by L. Vayda, Pittsburgh; A. C. Danks, Cleveland, and C. B. Ashmead of the Ashmead-Danks Co.

BALBACH METALS CORPORATION, New York. Casting copper and ingot bars, yellow brass ingots, composition ingots, prime desilverized pig lead, special antimonial pig lead, copper sulphate, copper shot, plumbers' lead, solder, babbitt and anti-friction metals, fine gold in bar form, fine silver in bar and shot form. Represented by James W. Paterson, vice-president; F. Schmutzer, secretary; James McNee, Jr. and George Paterson, sales department; R. H. Thomas and Thomas Thomson, metallurgists.

C. O. BARTLETT & SNOW CO., Cleveland. Equipment for tempering and distributing sand and mechanical carrying equipment for molds, cores and castings; photographs showing such equipment under actual operating conditions and indicating the saving that comes from handling and tempering with machines instead of by man-power and from carrying molds, cores and castings by continuous conveyors. Represented by J. L. McKinnon, secretary; H. C. Orr and S. Gertz, engineers.

BEARDSLEY-PIPER CO., Chicago. A portable type machine, suitable for jobbing foundries, in operation; also several reels of moving pictures of all of the company's machines in operation. Represented by E. O. Beardsley, president; W. F. Piper, secretary and treasurer; George Furman, sales manager; E. L. Mitchell, sales engineer; E. J. Byerlein, Minnesota and Wisconsin representative; Frank Hamel, Michigan and Indiana representative; J. A. Patterson, Michigan and Indiana representative; Pete Stefan, demonstrator.

BETHLEHEM STEEL CO., Bethlehem, Pa. Mayari pig iron in the form of pigs and sample bars made by various customers; also transparencies showing mining and production of Mayari iron from the ore to the finished product. Represented by D. A. Barkley, sales agent of pig iron, coke and coke by-products; H. G. Walton, sales agent of castings; Robert MacDonald and H. P. Kreulen, sales department; M. D. Salisbury, advertising department.

BERKSHIRE MFG. CO., Cleveland. Air squeezer molding machine, air squeezer pattern-draw molding machine, air squeezer stripping-plate molding machine, hand squeezer pattern-draw molding machine, vibrators, and aluminum snap flasks, etc. Represented by G. L. Cannon, W. D. Fraser and J. A. Scott.

S. BIRKENSTEIN & SONS, INC., Chicago. Non-ferrous metals. Represented by Louis Birkenstein, Harry Birkenstein, George Birkenstein, Eli Brown, Louis Caviale, Fred Heymann and Frank J. McCaul.

BLACK DIAMOND SAW & MACHINE WORKS, Natick, Mass. Combined band saw filing and setting machine, circular saw filing machine for wood and soft metal cutting saws,

COMMITTEE CHAIR-
MEN

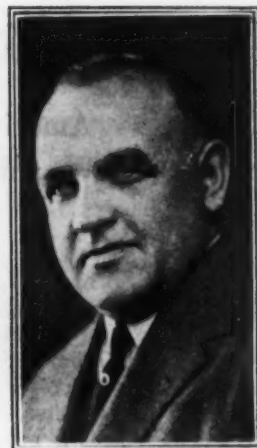
Ralph H. West, Executive Committee, West Steel Castings Co.; D. M. Avey, Publicity Committee, Penton Publishing Co.; A. O. Backert, Finance Committee, Penton Publishing Co.; C. F. Knowlton, Plant Visitation Committee, Westinghouse Electric & Mfg. Co.; J. R. Raible, Entertainment Committee, Fanner Mfg. Co.; Mrs. W. C. Sly, Ladies' Reception Committee; Werner G. Smith, Golf Committee, Werner G. Smith Co.



R. H. WEST



D. M. AVEY



A. O. BACKERT

brazing outfit for narrow band saws, high-speed metal-cutting saws for iron and steel, Black Diamond metal-cutting saws for brass, bronze and aluminum. Represented by Walter B. Ambler, vice-president.

BLYSTONE MFG. CO., Cambridge Springs, Pa. Blystone mixer with screen and power discharge and motor attached. Represented by H. M. Jay, sales manager; W. I. Kaufman, superintendent; J. S. Conroe, engineer; L. G. Conroe, general manager.

BONNOT CO., Canton, Ohio. A working model of company's Holbeck pulverized coal system; also literature describing company's machinery. Represented by Homer L. Rank, sales manager; E. W. Steele, chief engineer; L. E. Oldham, advertising manager, and S. Harter, assistant sales manager.

BRADLEY WASHFOUNTAIN CO., Milwaukee, Wis. A wash fountain for foundry use. Represented by Charles B. Kilmer.

BRIDGEPORT SAFETY EMERY WHEEL CO., Bridgeport, Conn. Exhibit of five grinding machines of the following types: one No. 7 alternating current, motor-driven floor grinder; one No. 2 alternating current, motor-driven floor grinder; one No. 2 alternating current, motor-driven combination wet and dry grinder; one FFF belt-driven floor grinder; one No. 16 direct current, motor-driven buffing lathe; one 16-in. sectional wheel chuck for use on Pratt & Whitney grinder; one 20-in. sectional wheel chuck for use on Blanchard grinder. Represented by D. T. Homan, vice-president, and I. L. Burritt.

BRITISH ALUMINUM CO., LTD., New York. Aluminum in form of ingots and semi-manufactured articles; also photographs of some of the samples of work done by the company's customers and also a line of samples showing development of metallic aluminum from the ores. Represented by Ernest V. Fannell, Arthur Jellinek and Arthur Seligman, American sales agent.

BUCKEYE PRODUCTS CO., Cincinnati. Foundry facings, core compounds, core oils, refractory cements, non-ferrous metal melting furnaces, various foundry equipment, such as electric and pneumatic sand riddling devices, oil burners and various foundry appliances. Represented by C. J. Goehring, president; E. O. Stamm, vice-president; C. P. Stamm, superintendent; E. C. Hearn and R. B. Ferguson, sales representatives.

C

CLEVELAND ARMATURE WORKS, INC., Cleveland. Grinding and buffing machines, all equipped with direct connected motors and Timken tapered roller bearings; also as a side line electrical repair parts, such as commutators, coils, fields, etc., for the maintenance of electrical equipment in foundries and steel mills. Represented by Messrs. Davis, Zell and Hibben.

CAMPBELL-HAUSFELD CO., Harrison, Ohio. Hausfeld complete unit metal melting furnaces of the non-crucible tilting type for gas or oil fuel, crucible furnace, stationary type crucible furnace and tilting type aluminum furnace using cast iron melting pot; also oil and gas burners for heating core ovens, etc., and the Hausfeld motor-driven oil pumping unit. Represented by E. B. Hausfeld, president; Joseph E. Hausfeld, treasurer; C. E. Haddock, secretary; J. S. Armour, sales manager; F. H. Crawford, Eastern sales representative.

CARBORUNDUM CO., Niagara Falls, N. Y. Carborundum and Aloxite grinding wheels and grain, Carborundum and Aloxite cloth and paper, refractory cements, Cannon radiating furnace, pyrometer tubes, section of Hawley-Schwartz furnace, refractory brick, tile and muffles. Represented by W. W. Sanderson, general sales manager, Niagara Falls; O. C. Dobson, district sales manager, Pittsburgh; H. E. Kerwin, sales, Chicago office; L. Pitt, sales, Cincinnati office; G. W. Chormann, sales engineer, Niagara Falls; E. F. Konker, salesman, Cleveland office; S. A. Fenno, assistant sales manager of refractory division, Perth Amboy, N. J.; E. W. Jones, salesman, refractory division, Perth Amboy, N. J.

CARTER BLOXONEND FLOORING CO., Cleveland. Three panels of Bloxonend flooring, one section creosoted and tanned to imbedded sleepers showing how the floor is installed in exposed areas; other two panels illustrating what is known as "lateral nailing," said to be the only floor of its kind where this method is used. The nails pass from one section of the floor through the tongues into adjoining sections parallel with top of floor, which permits installing on bare concrete; also photographs showing installations in many types of plants. Represented by L. L. Bucklew, manager, Cleveland; A. E. Gliese, salesman, Cleveland; Reuben Stowell, salesman, Chicago.

FRANK D. CHASE, INC., Chicago. Photographs and plans of foundries designed and built by this company. Represented by Frank D. Chase, president, and Fred Graf, foundry engineer.

CHICAGO CRUCIBLE CO., Chicago. Graphite crucibles, stopper heads and special refractory products. Represented by A. F. Hottinger, president; J. P. Foraker, vice-president; W. MacFadden, manager of sales; H. C. Sorenson, district manager; J. G. Crowe, sales department; Le Roy C. Taylor, factory superintendent; J. W. Mann, service department.

CLEVELAND PNEUMATIC TOOL CO., Cleveland. A complete line of air-operated foundry tools such as chipping hammers for cleaning room, sand rammers for floor flask bench and core ramming, core breakers for removing cores, portable ball-bearing air grinders for heavy and light grinding and for tool dressing, air drills, corner drills, breast drills; also a complete line of Cleco pressure-seated air valves, parallel, straightway and angle types; also three-way and four-way multiple outlet types; and a complete line of sizes of Bowes air hose couplings and Cleco Never-slip hose clamps. Represented by C. Greve, president; L. W. Greve, treasurer and general manager; H. S. Covey, secretary and sales manager; J. DeMooy, assistant sales manager; Guy Gregory, New York manager; F. E. Schwarze, Philadelphia manager; R. E. Manning, Pittsburgh manager; H. C. Newton, Chicago manager; C. D. Garner, Toronto, Ont., manager; R. E. Ahern, St. Louis; J. T. Graves, Cleveland; R. B. Van Norman, Philadelphia; J. C. Dockery, Boston, and A. W. Hughes, Toronto, Ont., salesmen.

CHISHOLM-MOORE MFG. CO., Cleveland. Complete line of chain hoists and trolleys, including a number of recent improvements; also display of the Atlas carry-all track systems, of which the Chisholm-Moore Mfg. Co. is exclusive distributor. Represented by E. S. Ludlow, H. C. McCoy, E. J. Newton and D. D. Dorsey.

CLARK TRACTOR CO., Buchanan, Mich. Hand hoist end dump model, automatic gravity end dump model, tractor model and Truclift model. Represented by L. J. Schneider, sales manager; R. J. Burrows, vice-president; J. W. Taylor, C. I. Ucker, F. E. Cooper, sales representatives, and J. Putnam Ware.

CLEVELAND BLOW PIPE & MFG. CO., Cleveland. A small model of dust-collecting system, showing its application for removing dust from buffing, polishing and emery wheels; also full size hoods for use on these machines, and a two-section sheet metal shower bath for foundry and factory use; safety guards for machinery and a sand-blast cabinet. Represented by E. Coney, president, and T. W. Roberts.

CLEVELAND CRANE & ENGINEERING CO. (Cleveland Electric Tramrail Division), Cleveland. Various types of hand and electric power carriers, including installation showing ball-bearing type of switches. Represented by C. C. Robbins, A. O. Garnett, E. T. Bennington, H. C. Webb, R. E. Nelles, A. F. Anjeakey, S. F. Joor, D. T. Laylin, J. T. Brady and F. E. Chilcott.

CLEVELAND FLUX CO., Cleveland. Complete display of samples of Cornell fluxes and parting, together with reproductions of testimonial letters from satisfied users; also a display of castings showing results with and without the use of the flux. Represented by Clifford B. Cornell, secretary-treasurer, assisted by Miss Ruth Cline, J. C. Cornell, Loren E. Souers, Wilson Kern, Miss Martha Harris.

CHICAGO PNEUMATIC TOOL CO., New York. Air compressors, portable, pneumatic and electric grinders, combination air hoist, sand, floor and bench-type rammers. Represented by A. C. Andresen, C. W. Campbell, C. B. Coates, Ross Watson and W. H. White.

CLEVELAND STEEL TOOL CO., Cleveland. Punches, dies, rivet sets and chisel blanks. Represented by R. J. Venning, G. H. Knebusch, F. F. Frey and J. E. Stenger.

CLEVELAND WIRE SPRING CO., Cleveland. Steel foundry boxes, barrels, core trays, core racks and miscellaneous shop equipment. Represented by J. W. Campbell, C. C. Klingman, R. J. Poole and A. T. Soden.

THOMAS E. COALE LUMBER CO., Philadelphia. Samples of pattern pine, flask pine and pattern mahogany. Represented by Thomas E. Coale, president, and Samuel D. Pettit, special representative.

F. A. COLEMAN CO., Cleveland. Electric rolling drawer core oven, rack oven, core rack, aluminum melting furnaces, core bench and lift truck. Represented by F. A. Coleman, president; C. G. Johnson, sales manager; P. E. Hand, secretary; F. G. Gensler, treasurer; S. A. Coleman, sales engineer; L. O. Ambrose, chief engineer; R. W. Bronson, mechanical engineer; L. J. Creelman, structural engineer.

COMBINED SUPPLY & EQUIPMENT CO., Buffalo, N. Y. Angle Stem and Double Angle chaplets. Represented by C. L. Jackson, vice-president, and S. Le Viness, Jr.

CORN PRODUCTS REFINING CO., New York. Display of cores made with company's core binder, Kordek; also the making and baking of cores in an electric oven. Represented by S. B. Krantz, F. G. Faller, Jr., A. H. Kreisler and Horace D. Farris.



C. F. KNOWLTON



J. R. RAIBLE



MRS. W. C. SLY



W. G. SMITH

D

DAVENPORT MACHINE & FOUNDRY Co., Davenport, Iowa. Working exhibit of one No. 24 Davenport joint roll-over pattern draw machine, one No. 24 Davenport joint strip machine and one No. 10 Davenport joint, squeezer and strip machine. Represented by Al. Magnuson, Carl Falk and Erle Byerlein, salesmen, and Arthur Ziebarth, engineer.

DAYTON PNEUMATIC TOOL Co., Dayton. Pneumatic riveting and chipping hammers and sand rammers; also a very light sand rammer which is used quite extensively on core work. Represented by E. C. Thompson, Wm. Gleasner, A. B. Clausen and L. B. George.

WILLIAM DEMMLER & BROTHERS, Kewanee, Ill. A line of core machines. Represented by F. A. Demmler and H. L. Demmler.

DETROIT ELECTRIC FURNACE Co., Detroit. Products of brass and other non-ferrous alloys made in the Detroit electric furnace, and literature describing processes of manufacture. Represented by E. L. Crosby, president; A. E. Rhoades, H. M. St. John and E. T. Gushee.

HENRY DISSTON & SONS, INC., Philadelphia. Metal cutting saws of all types, hack saw blades, both hand and machines, hack saw frames and a large collection of files. Represented by David M. Jenkins, L. L. Mather, Joseph Dorrington, W. M. Mather and W. B. Anderson.

JOSEPH DIXON CRUCIBLE Co., Jersey City, N. J. General line of graphite crucibles, stoppers, nozzles and graphite refractory specialties. Represented by R. R. Belleville, R. F. Leonard, F. R. Brandon, H. P. Smith, H. L. Hewson and A. L. Haasis.

DOCK & MILL Co., North Tonawanda, N. Y. White pine pattern and flask lumber and a white pine saw log, 3 ft. in diameter and 12 ft. long, with which to demonstrate how pattern, flask and template lumber can be purchased to best advantage and what grades should be purchased for different kinds of work. Represented by M. M. Smith, Thomas Donaldson, Elmer Semon, Henry Homeyer, John Klinger and Walter M. Nantke.

DOEBLER DIE-CASTING Co., Brooklyn. Die-castings of aluminum, zinc, tin and lead base alloys and also finished brass and bronze castings for phonographs, knitting and textile machines, automobile parts and accessories, paper cup dispensing and other vending machines, radio equipment and electrical devices, office appliances, vacuum cleaners, die-cast ice skates, rubber molds and motion picture projector and camera parts. Represented by Charles Pack, vice-president and chief metallurgist; H. B. Griffin, vice-president; H. J. Robbins and G. H. Haskell, sales engineers, and Marc Stern, engineer.

E

ELECTRIC WELDING MACHINE Co., Detroit. Weldrite welding machine and Castrite porosity tester. Represented by Sidney Harvey, president; J. C. Wilkie, director of sales; P. V. Peters, manager Cleveland office; George G. Morrison, Carl Buberl, salesmen, and A. Thomas, demonstrator.

ELECTRO REFRACTORIES CORPORATION, Buffalo. A line of Tercord crucibles and fire brick. Represented by L. U. Milward, W. E. Howard, W. B. Richards and C. A. Asher.

ELWELL-PARKER ELECTRIC Co., Cleveland. Industrial trucks especially designed for such loads as are conveyed in the foundry.

F

FANNER MFG. Co., Cleveland. Foundry chaplets of all styles, hard malleable tumbling mill starts, flask trimmings and malleable iron push nipples. Represented by C. Nelson Smith, in charge, and J. R. Reible, president; J. Y. Brooks, secretary-treasurer; S. H. Gibson, general superintendent; W. C. Hopkins, sales manager of malleable and gray iron castings; F. W. Beck, sales manager of finished product; J. E. O'Brien, supervisor of purchases; P. D. McDonald, foundry superintendent.

FEDERAL MALLEABLE Co., West Allis, Wis. A working exhibit of Rapid molding machines, including new Rapid joint squeezer stripper; also a collection of castings molded on Rapid machines in the various foundries throughout the country. Represented by K. H. Siemens, general manager of molding machine sales; L. C. Wilson and W. J. MacNeill.

FOUNDRY EQUIPMENT Co., Cleveland. Enlarged photographs of installations of Coleman core and mold ovens and furnaces. Represented by C. A. Barnett, H. W. Steindorf, S. D. Rickard, G. W. Bohn, M. A. Beltaire, Jr., and E. J. Byerlein.

G

GALLMEYER & LIVINGSTON Co., Grand Rapids, Mich. (Formerly Grand Rapids Grinding Machine Co.) Portable and bench-type grinding machines in operation; these

machines are equipped with highest grade ball bearings obtainable, it is stated, and equipment includes portable truck-type pedestal base, which affords a convenient means of moving machines from place to place. Represented by D. H. Shartle and George H. Newman, both of Cleveland.

GENERAL ELECTRIC Co., Schenectady, N. Y. Semi-automatic arc welder and model of induction furnace. Represented by C. S. Dixon, D. J. Moran, H. A. Lind, Thomas Wry, J. C. Trudinger, J. A. Eckles, H. J. Hunt, J. M. Sampson, I. B. Terry, F. C. Schelber, F. E. Delano, J. M. Hollister, R. D. Reed, P. A. McTerney, L. W. Shugg, C. T. McLoughlin and K. Tauda.

GLOBE IRON-CRUSH & SHOT Co., Mansfield, Ohio. Complete line of samples of Globe H. C. chilled shot and Globe iron-crush, metallic abrasives for sand blasting castings, forgings and heat-treated parts, together with samples of castings showing results obtained through the use of these abrasives. Represented by E. O. Townsend, vice-president, and L. A. Cline, secretary.

ROBERT GORDON, INC., Chicago. A quarter-sized working model of mechanical hot blast heater, together with numerous photographs showing the application of this unit as a shop heater. Represented by T. H. Monaghan, president; A. L. Weikel, sales manager.

GREAT WESTERN MFG. Co., Leavenworth, Kan. Combs gyratory foundry sand riddles in booth No. 15. Represented by P. L. Wilson, treasurer.

GRIMES MOLDING MACHINE Co., Detroit. One Grimes hand-rammed roll-over molding machine, one Grimes power-rammed roll-over molding machine, one Rathbone multiple molding machine using Union metal steel flasks and one Lowe sifting machine. Represented by George L. Grimes, Charles J. Skeffington and John A. Rathbone.

H

HANNA ENGINEERING WORKS, Chicago. Mumford air-squeeze split-pattern machines, Mumford vibrators and accessories, display of photographs of Mumford air-jolt machines and Hanna holsts. Represented by A. F. Jensen, president; J. C. Hanna, chief engineer; J. O. Clark, advertising manager; O. F. Weise, Chicago representative; E. J. Charron, Detroit representative.

HARDING Co., New York. Display of small operating models of the Hardinge conical mill, together with installation photographs and descriptive layouts showing how the mill operates and how it grinds the various classes of materials, such as graphite and coal for foundry facings, and slag sweepings and foundry waste for the recovery of brass, zinc, aluminum and other materials. Represented by G. F. Metz.

R. G. HASKINS Co., Chicago. Haskins' flexible shaft equipments and portable tools; also flexible tool equipments, embracing types ranging from 1/15 hp. to 2 hp., covering all the requirements of the metal industry from the lightest jewelers' and die sinkers' equipment to the heaviest machines used in the foundry; also a working model of the Spurgin belt shifter. Represented by R. G. Haskins.

HAUCK MFG. Co., Brooklyn. Hauck cupola lighters, mold dryers, ladle heaters, the new high and low pressure furnace burners for core ovens, Hauck pre-heaters used in connection with welding, and the Hauck open-hearth burner with automatic reversing valves. Represented by Herbert Vogelsang, Cleveland; F. A. Thomas, Pittsburgh; Jules Eschelman, Buffalo.

HAYWARD Co., New York. Hayward electric motor bucket, Hayward air-operated orange peel bucket and other clam shell and orange peel models. Represented by C. S. Sargent, H. C. Ryder and H. M. Davidson, manager of sales.

HERMAN PNEUMATIC MACHINE Co., Pittsburgh. A small working model of one of the company's large independent roll-over and pattern drawing machines. Represented by Thomas Kaveny, president; A. G. Doyle, vice-president; Richard Harris, secretary; Robert F. Ringle, works manager; I. J. Oesterling, chief engineer; R. P. Morgan, C. W. Miller, Robert M. Porthous, C. S. McMath and W. W. Hughes, service department.

HILL & GRIFFITH Co., Cincinnati. Reception booth. Represented by John Hill, president; William Oberhelman, vice-president and manager of Birmingham branch; M. Z. Fox, Chicago branch manager; Bruce Hill, sales manager; C. L. Gysin, traveling representative in Ohio, Kentucky and Indiana; John H. Lyle, traveling representative in Illinois, Wisconsin, Iowa and Minnesota; W. J. Smith, traveling representative in Ohio and Michigan.

HILLSIDE FLUOR SPAR MINES, Chicago. Various products of

(Continued on page 1226)

A Finding List of Foundry Show Exhibitors

Letter Following Name of Each Exhibitor Refers to Section
in Which Company's Exhibit Is Located

Air Reduction Sales Co.....R
Ajax Metal Co.....G
Albany Sand & Supply Co.....E
Allan Mfg. & Welding Co.....F
American Foundry Equipment Co..O
American Hominy Co.....A
Fred C. Andresen & Associates, Inc..L
Arcade Mfg. Co.....P

Arex Company.....L
Armstrong-Blum Mfg. Co.....M
Arrow Tools, Inc.....V
Asbury Graphite Mills.....E
E. C. Atkins & Co.....Q
Atlas Car & Mfg. Co.....B
Austin Co.....K
Automatic Transportation Co.....E

Bacharach Industrial Instrument Co..J
Balbach Smelting & Refining Co...H
C. O. Bartlett & Snow Co.....K
Beardsley & Piper Co.....M
Berkshire Mfg. Co.....T
Bethlehem Steel Co.....A
S. Birkenstein & Sons, Inc.....C
Black Diamond Saw & Machine
WorksF
Blystone Mfg. Co.....B
Bonnot Co.....B
Bradley Wash Fountain Co.....L
Brass World Publishing Co.....B
Bridgeport Safety Emery Wheel Co..P
British Aluminum Co.....E
Buckeye Products Co.....T

Campbell-Hausfeld Co.....P
Carborundum Co.....J
Carter Bloxonend Flooring Co.....B
Frank D. Chase, Inc.....J
Chicago Crucible Co.....H
Chicago Pneumatic Tool Co.....U
Chisholm-Moore Mfg. Co.....A
Clark Trutractor Co.....C
Cleveland Armature Works.....F
Cleveland Blow Pipe & Mfg. Co...L
Cleveland Electric Tramrail Div.
of C. C. & E. Co.....P
Cleveland Flux Co.....F
Cleveland Pneumatic Tool Co.....V
Cleveland Steel Tool Co.....F
Cleveland Vibrator Co.....T
Cleveland Wire Spring Co.....A
F. A. Coleman Co.....U
Combined Supply & Equipment Co..K
Thomas E. Coale Lumber Co.....G
Corn Products Refining Co.....B

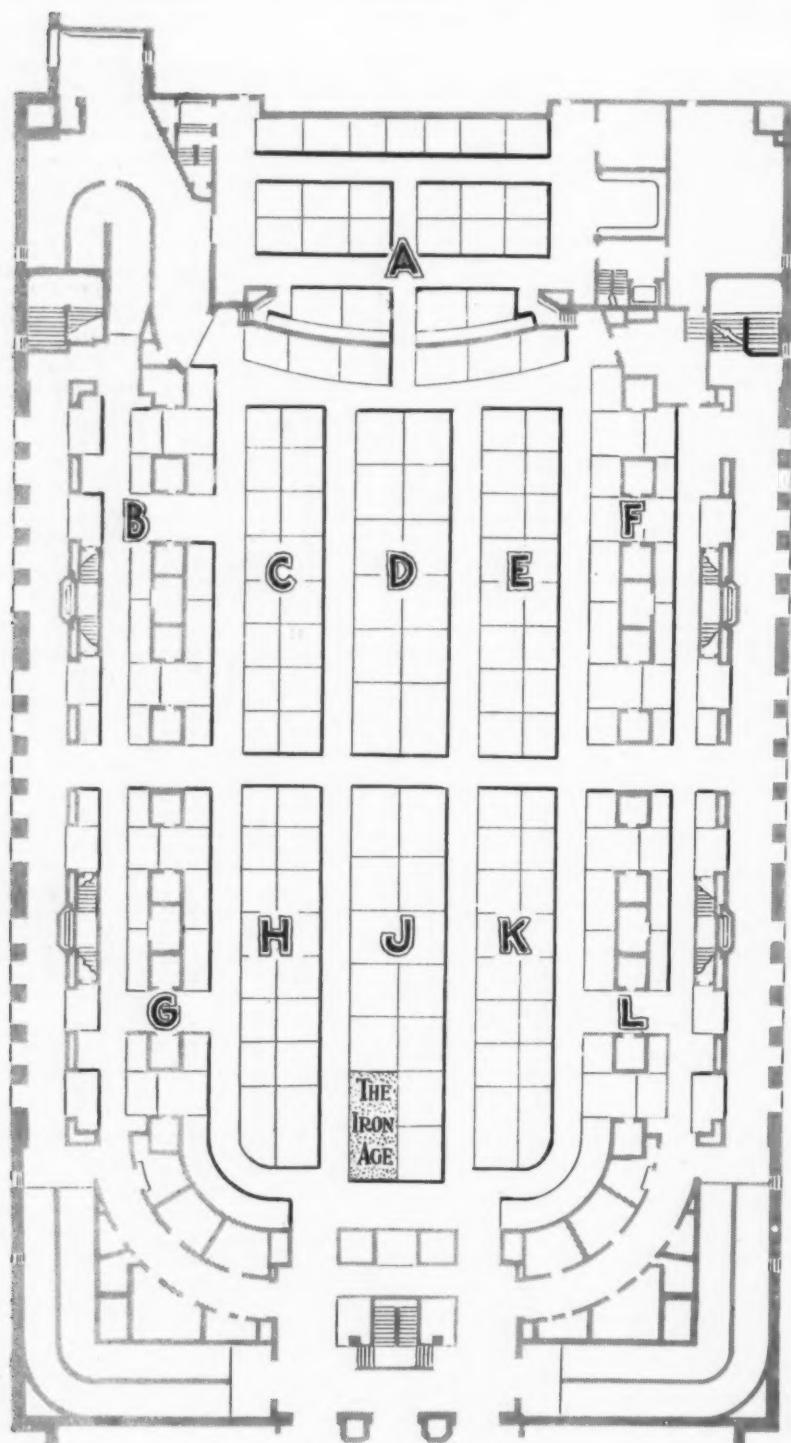
Davenport Machine & Foundry Co..P
Dayton Pneumatic Tool Co.....P
William Demmler & Bros.....S
Detroit Electric Furnace Co.....O
Henry Disston & Sons, Inc.....F
Joseph Dixon Crucible Co.....H
Dock & Mill Co.....B
Doehler Die Casting Co.....L

Electric Welding Machine Co.....T
Electro Refractories Co.....A
Elwell Parker Electric Co.....A

Fanner Mfg. Co.....K
Federal Foundry Supply Co.....C
Federal Malleable Co.....U
Foundry Equipment Co.....H

Gallmeyer & Livingston Co.....F
General Electric Co.....J
Gibb Instrument Co.....A
Globe Iron-Crush & Shot Co.....E
Robert Gordon, Inc.....L
Great Western Mfg. Co.....B
Grimes Molding Machine Co.....T

Hanna Engineering Works.....H
Hardinge Co., Inc.....L
R. G. Haskins Co.....F
Hauck Mfg. Co.....F
Hayward Co.....N
Herman Pneumatic Machine Co.....R
Hill & Griffith Co.....H
Hillside Fluor Spar Mines.K
Hoevel Mfg. Corp.....N
Holcroft & Co.....C



ARENA FLOOR OF THE NEW CLEVELAND AUDITORIUM

Independent Pneumatic Tool Co...M
Industrial Press.....K
Ingersoll-Rand Co.....N
International Molding Machine Co...P
Interstate Sand Co.....H
The Iron Age.....J

Johnston & Jennings Co.....Q
Jones Sand Co.....G

Charles C. Kavin Co.....K
Keller Mechanical Engraving Co...Q
Spencer Kellogg & Sons, Inc.....J
Julius King Optical Co.....H
Kindt-Collins Co.....A
King Refractories Co., Inc.....A
Knefler-Bates Mfg. Co.....B

Lakewood Engineering Co.....E
H. M. Lane Co.....L
Lava Crucible Co. of Pittsburgh....C
Leeds & Northrup Co.....L
Lewis-Shepard Co.....G
Link Belt Co.....D
Louden Machinery Co.....A
David Lupton's Sons Co.....H

C. E. McArthur.....E
J. S. McCormick Co.....E
McLain's System.....K
MacLean Publishing Co.....G
MacLeod Co.....O
Malleable Iron Fittings Co.....Q
Marschke Mfg. Co.....B
Master Tool Co.....L
Medart Co.....G
Menefee Foundry Co.....C
Mercury Mfg. Co.....B
Metal Industry.....G
Metal & Thermit Corp.....J
Michigan Smelting & Refining Co...C
Modern Pouring Device Co.....B
Monarch Engineering & Mfg. Co....D

National Engineering Co.....U
National Scale Corp.....A
New Haven Sand Blast Co.....P
William H. Nicholls Co., Inc.....U
Norma Co. of America.....K
Northern Blower Co.....G
Northern Refractories Co.....F
Norton Company.....J

S. Obermayer Co.....G
George Oldham & Son Co.....S
Oliver Machinery Co.....O
Osborn Mfg. Co.....R
Oxweld Acetylene Co.....S

Pangborn Corp.....T
J. W. Paxson Co.....K
Peerless Sand Co.....C
Peffer Oil Co.....A
Penton Publishing Co.....E
Pickands, Brown & Co.....L
Pittsburgh Electric Furnace Corp...K
Porcelain Enamel & Mfg. Co.....C
Portage Silica Co.....K
Henry E. Pridmore.....S

Quigley Furnace Specialties Co....J

Racine Tool & Machine Co.....F
Richards-Wilcox Mfg. Co.....D
Robeson Process Co.....J
Rogers, Brown & Co.....D
P. H. & F. M. Roots Co.....A
Roto Pneumatic Co.....Q
Royal Foundry & Machine Co.....T

Sabin Machine Co.....L
Safety Equipment Service Co.....L
Safety First Shoe Co.....F
Shepard Electric Crane & Hoist Co..N
Simonds Saw & Steel Co.....F
Skybryte Co.....A
W. W. Sly Mfg. Co.....D
Smith Facing & Supply Co.....H
Werner G. Smith Co.....J
Spencer Turbine Co.....N
Springfield Aluminum Plate &
Castings Co.....A

Springfield Facing Co.....A
Stamp Electric Hoist Co.....A
Standard Equipment Co.....U
Standard Sand & Machine Co.....S
Sterling Wheelbarrow Co.....D
Frederic B. Stevens, Inc.....A
N. A. Strand & Co.....F
Sullivan Machinery Co.....P
Super Arc Welding Machine Co...Q
Superior Sand Co.....H

Taber Mfg. Co.....V
Taylor Instrument Companies.....A
R. J. Teetor Co.....O
Warner R. Thompson Co.....C
Truscon Steel Co.....M N

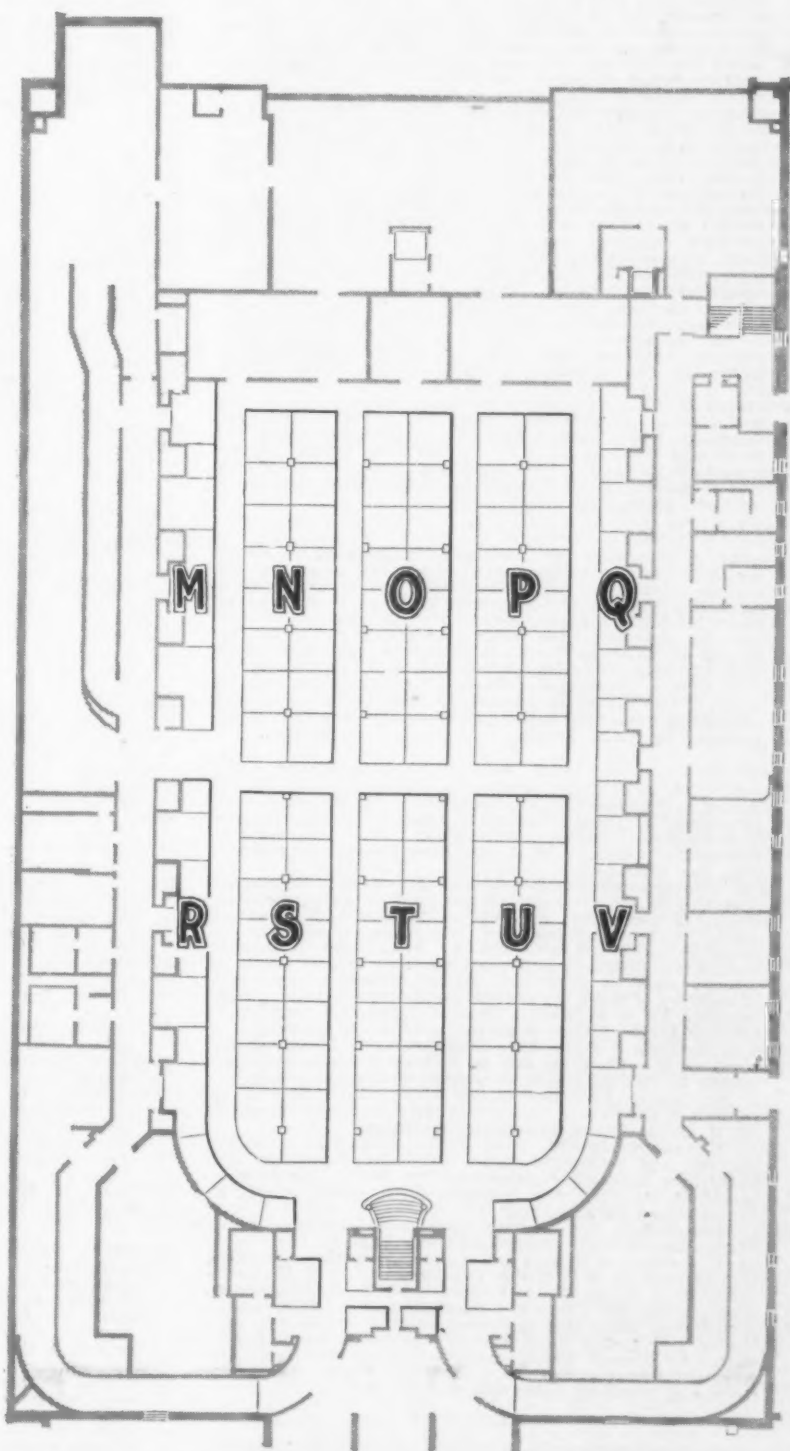
Union Petroleum Co.....B
United Compound Co.....L

United States Graphite Co.....L
United States Silica Co.....H

H. L. Wadsworth.....N
Wadworth Core Machine & Equip-
ment Co.....A
Waldo, Egbert & McClain, Inc.....E
J. D. Wallace & Co.....L
Westinghouse Electric & Mfg. Co..V
Westinghouse Traction Brake Co...V
White & Bro., Inc.....K
Whitehead Bros. Co.....C
Whiting Corp.....H S
E. J. Woodison Co.....S
Wyoming Shovel Works.....L

Young Bros. Co.....M

Zanesville Sand Co.....B



EXHIBITION HALL OF THE NEW CLEVELAND AUDITORIUM

(Continued from page 1223)

the company's fluor spar mines, including pure acid fluor spar, Hillside washed gravel fluor spar, table concentrates and a complete iron foundry flux called Fluorcite, which is just being put on the market. This new flux is composed of one-third fluor spar and two-thirds calcite (pure lime). All the materials come from the company's mine and are mixed there ready for shipment either in bulk or in bags. Represented by G. H. Jones, president, and Jay L. Hench, vice-president and manager of sales.

HOEVEL MFG. CORPORATION, Jersey City, N. J. Hoevel standard sand blast machines, including 88-in. rotary table, 66-in. rotary table, 32/40 revolving barrel machine and also 32/40 revolving barrel machine, 1923 model, a new type which maker says will prove of unusual interest to users of sandblast machinery. Represented by J. M. Betton, sales manager; L. B. Passmore, Western representative; O. W. Fisher, chief engineer; F. Kusel, mechanical engineer; M. Herbig, mechanician.

HOLCROFT & Co., Boston. Display of photographs, drawings and data pertaining to furnaces and ovens. Represented by C. T. Holcroft, president; R. T. Cadwell, secretary and treasurer; H. L. Ritts, sales manager; C. L. Joy, chief engineer.

I

INDEPENDENT PNEUMATIC TOOL CO., Chicago. Complete showing of Thor pneumatic tools and electric drills for foundry use, including Thor air drills, hammers, hoists, sand rammers, moisture separators, air grinders and Thor electric drills and grinders; also a new special chipper for foundry use to be known as the Thor size F2 foundry chipper, which is shorter and lighter than the present Thor model and has a special valve designed to withstand the cutting, grit and dirt of foundry use; also another device of particular interest in the Thor power-driven screw driver, which is for use in foundries for making patterns and repairing flasks. Represented by A. Anderson, sales engineer, Chicago; H. G. Keller, New York; F. H. Charbono, Philadelphia; H. F. White, Cleveland; Fred J. Passino, Pittsburgh; S. W. Lanham, Columbus, Ohio; Van W. Robinson, Detroit; G. H. Du Sell, Milwaukee; W. A. Nugent, St. Louis.

INGERSOLL-RAND CO., New York. A complete and working exhibit of various pneumatic tools, viz., sand rammers, grinders, chipping hammers, riveters, drills, etc.; also a 10-in. stroke duplex, two-stage air compressor, driven by means of standard induction motor, short belt drive; compressor in operation. Represented by G. A. Gallinger, general manager pneumatic tool sales, New York; L. W. Schnitzer, manager pneumatic tool sales in Chicago; J. W. Anderson, Pittsburgh; L. H. Geyer, assistant publicity manager, New York; G. C. Williams, manager pneumatic tool sales in Cleveland; H. G. Palen, Athens, Pa.

INTERNATIONAL MOLDING MACHINE CO., Chicago. Hand and power turn-over machines; hand and power combination machines, plain, power and combination squeezers and plain and combination jolt ramming machines. Represented by Edward A. Pridmore, president; W. W. Miller, vice-president; E. G. Borknis, M. J. Monahan and G. R. Mitchell, sales department.

J

JOHNSTON & JENNINGS CO., Cleveland. A working exhibit of air squeezers, combination jolt squeeze machine, jolt squeeze pattern drawing machines, jolt stripping plate machines, jolt roll-over pattern drawing machines and plain jarring machines, also vibrators and accessories; also for the first time the company's new line of improved air squeezers and jolt squeezers. Represented by T. J. Calhoun, J. L. Battenfeld and R. W. Gramling.

JONES SAND CO., Columbus, Ohio. A line of molding sands suitable for aluminum, brass, iron and steel castings; also ground fire clay for general foundry purposes. Represented by N. M. Jones.

K

CHARLES C. KAWIN CO., Chicago. Reception booth. Represented by Charles C. Kawin, president; J. H. Hopp, vice-president; J. Tissing, secretary; James Jordan, Eastern representative. Buffalo; William H. Griner, Central representative. Chicago; W. J. Mulcahy, Western representative. San Francisco.

KELLER MECHANICAL ENGRAVING CO., Brooklyn. Display in operation of latest model automatic die-sinking machine, which is especially adapted to pattern and core box work. This machine will take dies, core boxes or patterns up to 20 x 30 in. or over. It is entirely electrically operated and works from a master made of cement, wood or other soft material. Also photographs of samples of work turned out on Keller machines. Represented by S. A. Keller, Jules Dierckx, John C. Shaw, Charles Bitter, Henry Schreiber and A. J. Benson.

SPENCER KELLOGG & SONS, INC., Buffalo, N. Y. Core oil and cores made with these oils in various foundries. Represented by W. L. Goetz, manager core oil department; J. N. Yaeger, Chicago; E. G. Allen, Cincinnati; J. B. Catherall, Detroit; R. L. Girven, Eastern representative; W. B. Leslie, Cleveland district manager.

JULIUS KING OPTICAL CO., New York. Full line of safety goggles and welders' masks, sand blast helmets and babbitting masks. Represented by W. G. King, vice-president, assisted by J. J. Duffy, L. M. Baker and C. E. Partenheimer of sales staff.

KING REFRACTORIES CO., Buffalo, N. Y. A complete line of Flame brand high temperature cements for fire brick work, rammed-in linings and monolithic walls and baffles. Represented by S. C. Smith, president; E. J. Eddy, treasurer; E. G. Gaus, F. A. Podwills and R. S. Tappenden, representing the Cleveland Steel Sales Co., Ohio agent.

KNEFLER-BATES MFG. CO., Indianapolis, Ind. K-B dry core binder and facing flour, samples of cores, etc. Represented by Ernest Knefler, president; Hervey Bates III, secretary-treasurer; George B. Hill, sales manager; George P. Delaney, sales department.

L

LAKEWOOD ENGINEERING CO., Cleveland. One Lakewood No. 703 tier-lift truck, one Lakewood No. 701 tractor and one fifth-wheel type trailer, such as are used in and about foundries. Represented by Leon Gardner, sales manager; D. E. Van Deusen, industrial department, and W. A. Meddick, manager industrial department.

H. M. LANE CO., Detroit. Photographs and drawings of foundries which this company has designed or built. Represented by H. M. Lane, president, and A. O. Thomas, secretary-treasurer.

LAVA CRUCIBLE CO. OF PITTSBURGH, Pittsburgh. Crucibles, refractory cements and special refractory shapes. Represented by Paul L. Berkey, president; Furman Smith, Jr., secretary-treasurer; D. E. MacLean, sales.

LEWIS-SHEPARD CO., Boston. Jacklift elevating truck, Single-lift elevating truck, Stacker, a portable elevator, self-loading warehouse truck for handling barrels and boxes, steel leg platforms for elevating trucks and hardwood platforms for elevating trucks. Represented by Henry B. Shepard, Western sales manager, and H. L. Brooks, Cleveland district manager.

LINK-BELT CO., Chicago. Display of Link-Belt C-2 electric hoist, rope pulley plain trolley type, mounted and in full operation; also a Rapp revivifier and a small Link-Belt silent chain drive operated by motor and other samples of company's products along with enlarged photographs of working installations. Represented by S. L. Haines, Philadelphia, and A. G. J. Rapp, Chicago.

LOUDEN MACHINERY CO., Fairfield, Iowa. Louden overhead track and trolley equipment, including tracks, trolleys, cranes, elevators, hoists, switches, turntables, etc. Represented by L. P. Lawrence, Cleveland; L. F. Berthold, Chicago; O. L. Smith, Detroit; Walt Bayle, Cincinnati; William Buhl, Pittsburgh; E. H. Seelbach, Buffalo; L. E. Gaston, Philadelphia; W. H. Eldridge, New York City; E. C. Wood, Boston.

DAVID LUPTON'S SONS CO., Philadelphia. Lupton steel sash and pivoted type Pond continuous sash with Pond operating device, together with enlarged drawings and photographs showing the principle of design of Pond truss and Pond "A" frames and their adaptation to foundries. Represented by Clarke P. Pond, vice-president, engineering sales, assisted by William Pfeiffer, Cleveland district manager, and George J. Wagner, Cleveland manager.

M

C. E. MCARTHUR, Chicago. Combination pneumatic gagger machine rod straightener and shear, combination pneumatic rod straightener and shear, pneumatic rod cutters. Represented by C. E. McArthur, William M. Wilson and C. L. Stewart.

J. S. MCCORMICK CO., Pittsburgh. General line of foundry supplies, particularly Vulcan blacking, Lion binder, Matchless plumbago, molders' tools, molders' shovels, etc. Represented by J. S. McCormick, T. E. Malone, S. R. Costley, G. C. Smith and C. C. Bumbaugh.

McLAIN'S SYSTEM, Milwaukee, Wis. Samples of semi-steel castings of light section, such as cylinders, pistons, piston rings, gears, etc., hatchets, hammers, pliers and automobile tools of annealed semi-steel; also samples of lessons known as McLain's System of cupola practice, gray iron and semi-steel, or steel foundry practice covering all processes of making steel. Represented by David McLain and I. V. Scanlan.

MACLEOD CO., Cincinnati. Large photographs of different installations, a sand blast tumbling barrel, a sand blast cabinet and two oil burners. Represented by James Lauder and James Shields.

MAILEABLE IRON FITTINGS CO., Branford, Conn. A full line of vibrators, together with samples of all of the foundry accessories made by this company; also a Branford bag holder and the Branford universal vibrator, claimed to be the largest in the world, having a piston 5 in. in diameter and weighing 65 lb. Represented by G. B. Pickop, assistant superintendent, assisted by Frank Bosky, foreman of the core department.

MARSCHKE MFG. CO., Indianapolis, Ind. Electric motor-driven grinders. Represented by W. A. Marschke, sales manager, and F. W. Marschke, president and general manager.

MEDART CO., St. Louis. Medart cupola tapper and stopper. Represented by A. G. Kaiser, foundry superintendent.

MENEFEE FOUNDRY CO., Fort Wayne, Ind. Display of pattern mounts for roll-over draw molding machines made from Menco; also hard matches made from Menco. Represented by J. W. Menefee, C. M. Menefee and E. H. Menefee.

METAL & THERMIT CORPORATION, New York. No exhibit of products, but Arthur F. Braid, sales manager of metals and alloys, will be present representing the company's aluminothermic metals and alloys.

MICHIGAN SMELTING & REFINING CO., Detroit. A full line of ingot brass and bronzes, laying particular stress upon the quality of castings which are produced by customers from the company's ingots; also a number of castings made by customers both finished and roughed in connection with the ingots; also brass forgings and white material die castings, Babbitt material, solders and kindred lines. Represented by R. R. Arnold, C. F. McRae, T. R. McMannen, Harry L. Phillips, Marshall Gorman, John R. Searies, Henry Leavitt, Norman Sillman and B. P. Cook.

MONARCH ENGINEERING & MFG. CO. Special combination March core oven, all fuels, No. 125 tilting crucible furnace, No. 60 stationary crucible furnace, No. 350 patented iron pot aluminum tilting furnace, No. 92 Simplex furnace, oil or gas, No. 1 double chamber brass furnace, oil or gas, No. 5 motor-driven revolving furnace, oil or gas, Blizzard sand mixer, tilting and stationary iron cupolette, small capacity. Represented by George C. Schimpf, Lees Hall, Frank Maujean, James V. Martin and H. D. Harvey.

N

NATIONAL ENGINEERING CO., Chicago. Simpson sand mixer and Simpson bucket loader, showing the method of loading sand into the mixer, the mixer actually blending foundry sands. Represented by H. S. Simpson, president; B. Castor, mechanical engineer; S. H. Cleland, Eastern sales manager; C. D. Hollins, C. J. Skeffington and A. Haigh, sales representatives.

NATIONAL SCALE CORPORATION, Chicopee Falls, Mass. National counting and weighing machines, National multi-unit adjustable steel shelving, National calling system, National scale truck and National elevating truck, the full line consisting of an exhibit of efficiency producing equipment. Represented by C. H. Mercer, Cleveland; H. S. Trezevant, Detroit; W. B. Paulson, Chicago; J. S. Bierhardt, Syracuse; Frank A. Moran, factory superintendent; L. I. Howard, secretary and association treasurer.

NEW HAVEN SAND-BLAST CO., New Haven, Conn. Sand-blast

machines. Represented by C. E. Billings, Donald S. Sammis and George C. Fatscher.

WILLIAM H. NICHOLLS Co., Brooklyn. Eight or ten machines of various types for foundry operations. Represented by William H. Nicholls, president; George E. Karl, superintendent; James F. Hines, E. J. Byerlein, representatives.

NORMA Co. OF AMERICA, Long Island City, N. Y. Norma precision ball bearings, Norma ball thrust bearings, Norma Minimater, a precision measuring instrument; Hoffman precision roller bearings of the self-aligning and standard types; Hoffman ball thrust bearings. Represented by R. E. Hecker, engineering sales representative, who is in charge of company's Cleveland office.

NORTHERN BLOWER Co., Cleveland. Exhibiting in part its line of core ovens, emery exhaust systems, dust arresters, etc. Represented by C. Uthe, Charles Weger, L. L. Eiben and M. A. Eiben.

NORTON Co., Worcester, Mass. Norton floor stands and bench stands suitable for foundry work, and a display of grinding wheels, featuring particularly the type of wheels used in foundry work. Represented by Albert R. Sandine, district manager, Cleveland, assisted by R. H. Cannon, A. T. Douglas and G. A. Park.

O

S. OBERMAYER Co., Chicago. Exhibit of various grindings of sea coal facings and the coal from which this material is ground; also several grades of refractory materials for furnace linings, the Obermayer new sprue cutter, foundry flasks, jackets and bands; also a complete supply of various materials used in foundries such as facings, partings, etc.

GEORGE OLDFHAM & SON Co., Baltimore, Md. Chipping hammers, bench rammers, floor rammers, scalers and riveters, all of this material being pneumatic equipment. Represented by J. T. Biles, Cleveland; H. J. Bannister, assistant treasurer; R. W. Nelson, sales manager; C. M. Hartzell and W. W. Davidson, Ohio representatives, and C. E. Wortham.

OLIVER MACHINERY Co., Grand Rapids, Mich. Display of motor-on arbor variety saw bench, motor-on-shaft 36-in. band saw, direct motor-driven 16-in. hand planer and jointer with shaftless motor; direct motor-driven 30-in. surfacer with shaftless motor; No. 75-C pattern milling machine, small size, motor-in-head universal vertical boring machine, motor head speed lathe, self-contained motor-driven variety oilstone tool grinder, 15-in. direct motor-driven portable disk sander, 18-in. direct motor-driven band sawing machine, 6-in. portable hand planer and jointer, direct motor driven, motor head direct current patternmaker's lathe, No. 3 universal wood trimmer, No. 9 bench wood trimmer, patternmaker's bench with universal patternmaker's front vise type embossing machine. Some of these machines have never before been exhibited. Represented by A. S. Kurkjian, sales manager; Arthur Blake, manager New York office; G. C. Conklin, manager Chicago office; J. R. Duthie, Cleveland representative, and J. E. McLaughlin, Detroit representative.

OXWELD ACETYLENE Co., New York. Equipment for oxy-acetylene welding, including different types of blowpipes, regulators, etc.; an acetylene generator, portable welding and cutting outfits, a manifold system with which to centralize a plant's supply of oxygen, and sundry items connected with the use of the process on different foundry applications. Represented by C. E. Ziesel, assistant sales manager, Chicago; J. V. Upton, district manager, Cleveland; Joseph Hemerlein, demonstrator, and N. Hamilton, demonstrator.

P

PANGBORN CORPORATION. Exhibit in operation of room sand blast, hygienic cabinet sand blast, rotary tables and barrel sand blasts in various types and sizes. Represented by Thomas W. Pangborn, president; John C. Pangborn, vice-president; P. J. Potter, works manager; Foster J. Hull, mechanical engineer; H. D. Gates, sales manager; George W. Cooley, Jesse J. Bowen, Roy C. Koch, Fred E. Wolf, Charles T. Bird and W. C. Lytle, district sales engineers.

J. W. PAXSON Co., Philadelphia. Sand blast tumbling barrel, sand blast turn table, sand blast hose machine, foundry molding sand and supplies. Represented by H. M. Bougher, I. F. Kremer, H. Titgen, H. F. Hoevel and J. F. Gaehring.

PEERLESS SAND Co., Conneaut, Ohio. Complete line of molding and core sands. Represented by C. M. Bixler, F. L. Moore, C. J. Dow and U. E. Kanavel, secretary-treasurer.

PICKANDS, BROWN & Co., Chicago. Samples of pig iron and by-product coke. Represented by G. A. T. Long and various sales representatives.

PITTSBURGH ELECTRIC FURNACE CORPORATION, Pittsburgh. Samples of steel castings, gray iron castings, etc., and photographs of some of the company's recent installations. Represented by W. B. Wallis, president; H. E. Bromer, assistant sales manager; J. R. Eckley, sales engineer; J. F. Baker, advertising manager; Presley Hamilton, New York; R. D. Thomas, Philadelphia; Alexander Haigh, Boston; O. J. Abell, Chicago; L. B. Foster, Cleveland; M. A. Beltaire, Detroit; Mr. Kammerer, St. Louis.

PORCELAIN ENAMEL & MFG. Co., Baltimore, Md. Reception booth for convenience of customers. Represented by Heinrich Turk, president; Karl Turk, vice-president; Frank G. Roberts and W. R. Greer.

PORTAGE SILICA Co., Youngstown, Ohio. Samples of Portage steel molding, core and sand blast sands and a sample of Portage silica rock in its natural state. Represented by E. E. Kloox, vice-president and general manager; L. R. Farrell, secretary and sales manager, and C. F. Eberhart, chief clerk.

HENRY E. PRIDMORE, Chicago. One 12 x 12-in. power squeeze strip machine, one 16 x 20 x 8-in. draw combination jolt, hand strip machine and one 24 x 24 x 8-in. draw combination jolt, power rock-over, foot draw machine. Represented by Mrs. Henry E. Pridmore, president and treasurer; Henry A. Pridmore, vice-president and secretary; Marshall E. Pridmore, Earl B. Pridmore, D. F. Eagan, C. H. Ellis, F. W. Hamel.

Q

QUIGLEY FURNACE SPECIALTIES Co., New York. Demonstration of Hytemplate, a high temperature cement for bonding refractory materials, including its use for furnace linings,

cupolas, foundry ladles and for the manufacture of special shapes and rammed-in linings; also Carbosand, a highly refractory fire sand used for rammed-in linings by bonding with Hytemplate and for making special shapes; also a new refractory product known as Mono-Line, a ready-to-use ganister, which carries its own natural binder, being used for lining and patching cupolas, ladles, converters, pit furnaces, tilting crucibles and open-flame furnaces. Demonstrations made by electric furnace. Insulbrix and Insuline products used for conservation of heat in furnace structures also shown. Represented by W. S. Quigley, president; W. H. Gaylord, Jr., traveling sales manager; W. A. Toohill, service engineer.

R

RACINE TOOL & MACHINE Co., Racine, Wis. Fairly complete display of company's machines, including its No. 5, a high-speed, metal-cutting machine equipped with Westinghouse motor mounted overhead and driving through Link-Belt silent chain; also two Racine portable band saws, duplex type, and one of smaller machines such as Racine, Jr., motor driven. Represented by M. E. Erskine, president; Mr. Larson, Chicago district salesman; D. B. Maxwell, Pittsburgh district salesman; Mr. Reinhart, superintendent.

RICHARDS-WILCOX MFG. Co., Aurora, Ill. A complete over-Run Way monorail system consisting of switches, turntables, traveling cranes and ball-bearing I-beam trolleys. Represented by W. H. Fitch, president; E. J. G. Phillips, chief engineer; A. J. Eggleston, Chicago office; C. E. White, Indianapolis office; J. A. White, Ohio representative; Frank Wente and W. Charles Wente, Cincinnati branch; H. R. Butler, New York branch; Burt Daugherty and E. A. Smith, Cleveland branch.

ROBESON PROCESS Co., New York. Samples of the company's core binders known as Glutrin and Goulac. The former is a liquid manufactured and sold by the Robeson Process Co. and the latter is a powder sold by the American Gum Products Co., with which the Robeson company is affiliated; also exhibiting various cores in which these binders have been used, also various sizes and shapes of castings. Represented by Gordon I. Lindsay, president of both companies; W. Ed. Baird, T. J. Ryan, T. J. O'Hara and B. W. Bullen.

ROGERS, BROWN & Co., Cincinnati. Demonstrating a new metal mixture calculator. A handy working calculator distributed to all connected with the foundry industry. Stenographic and telephone service provided and telegrams taken care of for all who attend the convention. Represented by J. C. Mears, St. Louis; A. B. Weaver, Chicago; Harwood Wilson, C. P. Hellwig and L. M. Billingslea, Cleveland; R. T. Melville, A. F. Stengel and W. R. Maher, Buffalo; Thomas A. Wilson and C. D. Shepard, Pittsburgh; George R. Sullivan and S. B. Morrison, Philadelphia; J. C. Clausen and F. E. Pitts, New York; H. W. Fernald, Boston; F. W. Bauer, A. J. Wentworth, F. I. Teal, L. W. Hoeflinghoff and J. R. Morehead, Cincinnati.

P. H. & F. M. ROOTS Co., Connersville, Ind. A moving model showing the operation of Roots foundry type blowers, also stressing the company's charging hoist for foundry cupolas, which was a feature of last year's exhibit. Represented by W. H. Morgan, manager of foundry equipment department; H. M. Papsworth, New York manager; J. B. Patterson, Chicago manager; D. R. Schively, home office engineer.

ROTO PNEUMATIC Co., Cleveland. Roto pneumatic portable air grinders as well as some Clark electric tools. Represented by E. J. Moore and R. J. Emerich.

ROYER FOUNDRY & MACHINE Co., Wilkes-Barre, Pa. Royer sand separator and blender of an improved type and two other machines. Represented by G. F. Royer, president and general manager; John Lloyd, vice-president and assistant secretary; W. M. Williams, secretary and treasurer.

S

SABIN MACHINE Co., Cleveland. Sabin open-top steel foundry barrels for holding castings and Sabin one-man, two-wheel warehouse trucks for handling foundry barrels, an especially designed truck making it possible for one man to handle barrels of castings weighing up to 800 or 900 lb. without assistance. Represented by H. B. Sabin, O. C. Sabin and A. E. Dorod.

SAFETY EQUIPMENT SERVICE Co., Cleveland. Display of safety equipment, including safety clothing, gloves, leggings, aprons, sleevelets, chippers' and grinders' goggles, welders' goggles and hoods, sand blast helmets, dust hood, respirators, safety and danger signs, bulletin boards and first aid equipment. Represented by B. W. Nutt, president, and H. L. Wood.

SAFETY FIRST SHOE Co., Boston. Samples of four different types of shoes which are constructed with the idea of giving workmen in industrial plants as much protection for their feet as possible, and at the same time giving them shoes that will be less fatiguing and more attractive than the average working shoe. Represented by Edgar C. Davidson, sales manager.

SHEPARD ELECTRIC CRANE & HOIST Co., Montour Falls, N. Y. Ten-ton electric crane trolley, 3-ton cage controlled monorail hoist; also several Shepard electric Liftabouts and gearing such as is used in these hoists, disassembled motors such as are used on them, etc. Represented by F. A. Hatch, vice-president and general manager; R. H. McGredy, secretary and sales manager; N. P. Farrar, Cleveland district manager; H. A. Baugh, sales engineer; W. B. Briggs, Chicago district manager; W. C. Minier, sales engineer.

SIMONDS SAW & STEEL Co., Fitchburg, Mass. All varieties of metal-cutting circular and band saws, hack saw blades and files, including a special demonstration of a cold cutting-off machine illustrating the work which can be done by a fine tooth inserted tooth metal-cutting saw. Represented by H. R. McDonald and George T. Curtis.

SKYBRYTE Co., Cleveland. Demonstration of company's product, Skybryte, which is a glass cleaner especially adapted for keeping clear windows in foundries and other manufacturing buildings, and thus keeping light bills at a minimum. Foundrymen invited to submit pieces of glass considered difficult to clean so that efficacy of Skybryte may be shown.

W. W. SLY MFG. Co., Cleveland. A model demonstrating the pneumatic method of elevation when used in connection with an abrasive such as Slyblast, which this company manufactures, this model incorporating the features of pneumatic separation of abrasive from dust and core

sand as achieved in Sly dust arresters; also Slyblast tilted mill and a new pressure tank. Represented by S. C. Vessy, president; F. W. Klatt, general manager; F. A. Ebeling, sales manager; D. L. Harris, assistant sales manager; G. A. Boesger, chief engineer; D. P. Carter, Eastern representative; C. P. Gulon, Western representative; M. T. Mortensen, Detroit representative; Mr. Dougherty, Philadelphia; Mr. Kammerer, St. Louis; Mr. Hasselle, Tennessee representative; Mr. Kingsland, Hamilton, Ont.; J. C. Wilkinson, Toronto, Ont.

SMITH FACING SUPPLY CO., Cleveland. Display of some of the company's facings and compounds. Represented by George W. Fleig, president; F. Ray Fleig, vice-president; James S. Smith, secretary-treasurer.

WERNER G. SMITH CO., Cleveland. Samples of Linoil and other core oils manufactured by the company; also specimen cores from various foundries using the company's core oils. Represented by Werner G. Smith, president; Milton S. Finley, vice-president; Norman A. Boyle, treasurer; John C. DeVenne, secretary; Frank Dodge, Detroit manager; L. P. Robinson, New England manager; John M. Glass, Indianapolis representative; William E. Rayel, service specialist; I. M. Gerteis, sales department; Louis F. Ferster, advertising manager.

SPENCER TURBINE CO., Hartford, Conn. Three turbo compressors, largest of which has capacity of 3350 c. f. m. at 1 lb. pressure and the others having capacity of 450 c. f. m. at 1½ lb. pressure and 125 c. f. m. at 1 lb. pressure, respectively. These compressors are used for supplying air for foundry cupolas as well as for oil and gas burning industrial furnaces. Represented by H. M. Grossman, sales engineer.

SPRINGFIELD ALUMINUM FLATE & CASTINGS CO., Springfield, Ohio. Match-plates of various kinds, blank aluminum plates, crown plates and the company's new mold jacket. Represented by I. F. Hook and E. A. Parker.

SPRINGFIELD FACING CO., Springfield, Mass. Samples of plumbago, core wash, core compounds, parting and cements. Represented by F. B. Atwood, treasurer and general manager, and Thomas F. Stokes.

STAMP ELECTRIC HOIST CO., Cleveland. Exhibiting Stamp electric hoist. Represented by C. E. Stamp, F. F. Seaman, R. E. Annis and W. T. West.

STANDARD EQUIPMENT CO., New Haven, Conn. One No. 3 standard radial blast sand blast barrel with direct worm gear motor drive and also several parts and accessories. Represented by C. A. Dreisbach and C. S. Johnson.

STANDARD SAND & MACHINE CO., Cleveland. Sand pulverizing and mixing machinery. Represented by Harry E. Boughton and Paul E. Lacey.

STERLING WHEELBARROW CO., Milwaukee. Steel flasks, wheelbarrows and foundry specialties. Represented by H. H. Baker, Milwaukee; J. M. Dickson, Cleveland; George H. Lambkin, New York; J. J. Coyne, Chicago; H. J. Feisburg, Philadelphia; W. J. Romain, Boston.

FREDERIC B. STEVENS, Detroit. Reception booth. Represented by officers of the company and several traveling representatives.

N. A. STRAND & CO., Chicago. A full display of all of the flexible shaft grinding machines which this firm manufactures. Represented by C. W. Blakeslee, sales manager N. A. Strand, president; George C. McKay, local representative.

SULLIVAN MACHINERY CO., Chicago. One Sullivan 14 and 8½ x 10-in. angle compound, belt-driven compressor in operation, supplying air at 80-lb. pressure for other exhibitors; this machine operated by a 75-hp., a. c. motor connected to the compressor by a short belt drive; also one Sullivan WG-6 straight-line, single-stage splash oiled compressor, size 10 x 10 in.; also two Sullivan core busters, compressed air type; one Sullivan utility forge hammer; one Sullivan single-drum turbine air hoist. Represented by Ralph T. Stone, manager of Cleveland office, in charge.

SUPER ARC WELDING MACHINE CO., Detroit. Super Arc welder, which welds cast iron by the alternating current erratic arc process, making it possible to work on the most particular castings without re-heating. It is claimed also for this device that all danger of distortion is eliminated because a long constant arc is not used. Represented by J. P. Kryza, factory manager; H. E. Bradford, sales manager; O. T. Bredeken, salesman; Stanley Kosmer, demonstrator.

SUPERIOR SAND CO., Cleveland. A full line of molding sands for gray iron, malleable iron, brass and aluminum castings of all kinds. Represented by W. H. Smith, W. T. Findley and H. C. Koontz.

T

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y. Recording thermometers, indicating thermometers and pyrometers. Represented by G. A. Howell, Henry W. Maurer, Jr., and Nelson C. Schmid.

WARNER R. THOMPSON CO., Detroit. Core sands of all varieties. Represented by W. Edward Thompson, John E. Love, Miss Frances J. Snyder, Warner R. Thompson.

TRUSCON STEEL CO., Youngstown, Ohio. Truscon alloy steel foundry flasks, platforms and boxes, bottom boards, core plates, corrugated bands, flat bands, tote boxes, scrap boxes, coke boxes, runner boxes, elevator buckets, conveyor flights, core racks, ladles; also Truscon gagers, steel windows, window operators, standard steel doors, standard buildings, Hy-rib and metal lath, steel joists, reinforcing steel of all types, technical paints, roof slabs, etc. Represented by G. F. Sparks, Youngstown, Ohio; F. F. Griswold, Cleveland; G. E. Madden, Pittsburgh; G. E. Snedeker, New York; J. A. Morrissey, Buffalo, N. Y.; J. C. Peirce, Chicago; H. W. Jencks, Detroit; N. C. Ferreri and P. A. Nuttall, Youngstown.

U

UNITED COMPOUND CO., Buffalo, N. Y. Buffalo brand vent wax, Buffalo brand pattern wax and Buffalo corrugated gagers. Represented by John W. Bradley and L. F. Loney.

UNITED STATES GRAPHITE CO., Saginaw, Mich. A full line of Mexican graphite plumbago, foundry facing and core wash, as well as carbon, graphite and metal motor and generator brushes and Mexican graphite greases, paints, pipe joint compounds, etc. Represented by C. D. McIntosh, H. F. Gump, G. D. Robinson, A. J. Heindel and R. J. Edmiston.

UNITED STATES SILICA CO., Chicago. Samples of company's products, including Flint Shot, a sand blast abrasive; Flint Silica, a steel molding and core sand, and Banding Sand, a sand blast abrasive; also samples of castings—

gray iron, malleable iron, steel and non-ferrous—which have been sand blasted with Flint Shot and Banding Sand. Represented by Volney Foster, president; Harry F. Goebig, secretary; L. B. Coats, auditor.

W

WADEWORTH CORE MACHINE & EQUIPMENT CO., Akron, Ohio. Wadsworth core making machines, Wadsworth core cutting-off and coning machines and Wadsworth steel reinforced, core trays. Represented by G. H. Wadsworth, president and general manager; M. C. Semmons, secretary; L. L. Crane, superintendent.

WALDO, EGBERT & MCCLAIN, Buffalo, N. Y. Samples of Wickwire foundry iron in various grades, Mannie high phosphorus iron, Globe high silicon iron, Virginia standard iron, Everett by-product and Rainey beehive coke, Superior sheet steel and gas and steam coals. Represented by Fred J. Waldo, president; Justus Egbert, vice-president; William J. McClain, secretary-treasurer; Loring C. Calkins, manager Boston office; Karl E. Engstrom, New England salesman, and Michael F. Selbert, auditor.

J. D. WALLACE & CO., Chicago. Wallace 4-in. bench planer, 6-in. jointer, plain saw, universal saw, 16-in. band saw, Wallace electric glue pot, Wallace electric solder pot. Represented by J. D. Wallace, president; H. L. Ramsey, general sales manager; F. W. Andresen, Cleveland district sales manager; A. M. Andresen, Pittsburgh district sales manager; H. K. Keller, assistant sales manager.

WESTINGHOUSE ELECTRIC & MFG. CO., East Pittsburgh, Pa. Exhibiting a 200-kw. motor generator set, 2200 volts, 3-phase, 60 cycle, to be connected with an automatic substation switchboard; also in operation a core baking oven with a demonstrator making wattmeter base cores with a small core-baking machine; also a 200 hp. motor with control and brake in operation. Represented by W. W. Reddie and C. D. Pence, industrial sales department; W. L. Newmeyer and Phelan McShane, engineers; H. F. Seifert, assistant superintendent of Linhart works; J. L. Jones, chemical laboratory, and P. H. Grunnagle, department of publicity.

WESTINGHOUSE TRACTION BRAKE CO., Pittsburgh. Westinghouse National type, 3 VS-24, 335 cu. ft. piston displacement motor-driven air compressor driven from a 60 hp., 3-phase, 60-cycle, 220-volt, a. c. motor, through herringbone gear and pinion, including latest type Westinghouse "HP" control, automatic water control valve, all mounted on common bed plate, making complete self-contained unit; also Westinghouse 42½ x 96 in. main reservoir, enameled inside and out, designed for a working pressure of 140 lb. per sq. in., including drain cock, 5-in. single pointer air gage, safety valve, etc.; also several different types of Westinghouse air-operating valves, suitable for both single and double-acting cylinders, as well as a number of standard air cutout cocks, ½-in. air hose with fittings, etc., all of which have found a large use in industrial plants due particularly to their rugged construction and design, which makes it possible, it is claimed, to maintain air supply with minimum losses due to leaks, etc. Represented by M. A. Burchard, representative at Chicago; S. A. King, Jr., industrial representative at Chicago; O. H. Miller, industrial representative at New York; J. F. Ames, mechanical expert, New York; F. C. Young, representative, Pittsburgh; S. B. Schrontz, industrial representative, Pittsburgh.

WHITE & BRO., INC., Philadelphia. "C.C." brand of casting copper, bronze and composition ingot metals of every description. Represented by Clarence B. White, president; Frank Krug, sales manager; Raymond Hunter, New England representative; G. Horace Krider, New York representative; L. D. Kluver, Western representative.

WHITEHEAD BROTHERS CO., Buffalo. Foundry sands, clays and gravels, foundry facing, core binders and supplies. Represented by C. E. Andrews, V. L. Whitehead, Jr., A. Y. Gregory, F. B. Clarke, R. L. Carpenter, T. Hogan, J. H. Whitehead, A. J. Miller, R. L. Cleland, A. W. Jacus, H. B. Hanley and R. Hashagen.

WHITING CORPORATION, Harvey, Ill. Sand cutting and screening machine, tumbling barrel with motor in operation, solenoid brake with motor in operation, foot brake with electric cranes, helical-worm geared crane ladle, air hoist and photographs, drawings, etc., relating to cranes and foundry equipment; also a powdered coal feeding unit built by the Grindie Fuel Equipment Co., a subsidiary of the Whiting Corporation. Represented by J. H. Whiting, president; R. H. Bourne, vice-president and sales manager; J. R. Bates, vice-president, New York office; A. H. McDougall, consulting engineer; J. S. Townsend, mechanical engineer; R. E. Prussing, sales engineer; R. J. Thomas, sales engineer; D. F. Olderman, sales engineer; A. W. Gregg, foundry superintendent; G. P. Fisher, metallurgist; C. H. Erickson, service engineer; A. J. Grindie, general manager Grindie Fuel Equipment Co.

E. J. WOODISON CO., Detroit. Woodison core blowing machine, Woodison swan core machine and Woodison ball roll-over core machine, the Woodison tepper core machine, the Lowe electric sand sifter and the electric core oven. Represented by E. J. Woodison, J. C. Woodison, C. H. Woodison, G. A. Hurman, A. W. Ferguson, W. J. Wark, J. M. Witters, M. A. Bell, R. S. Hoffman, A. F. Jordan, H. Z. Dingee, G. H. Donoghue, F. F. Shortleeves, C. D. Pinkerton, R. V. Kennedy and D. A. Williston.

WYOMING SHOVEL WORKS, Wyoming, Pa. Shovels for foundry use. Represented by Stanley H. Smith, R. O. Emery and G. E. Byers.

Y

YOUNG BROTHERS CO., Detroit. A new type drawer oven, which is made in small units; an operating test or laboratory oven, with automatic temperature control and recording thermometer; a working model of a large continuous core baking installation now being completed; photographs of many typical installations. Represented by George A. Young, R. B. Read, sales manager; V. A. Fox, T. P. McVicker, J. E. Randall and T. F. Endres.

Z

ZANESVILLE SAND CO., Zanesville, Ohio. All grades of molding sand, both natural and milled, for all classes of brass, aluminum, gray iron and malleable work. Represented by Fred G. Flegal, secretary-treasurer.

Convention of Sheet Steel Executives

(Continued from page 1183)

employment in a steel mill at \$4 for a 10-hr. day, when he can earn, \$7.20 a day carrying a hod for 8 hours; \$5.60 a day for pushing a wheelbarrow 8 hours; \$4 a day for 8 hours work on public roads; \$4.40 a day for 8 hours in a foundry, where the work more closely compares with steel mill labor than in any other industry and where they are just as short of labor as we are?" asked Mr. Patterson.

After speaking of much higher wages paid in other lines, such as the building trades, Mr. Patterson emphasized the fact that the market price of sheets at the present time does not justify higher hourly wage rates. He declared that increasing wages does not increase the supply of available labor and said that even if wages were increased to the level of the building trades and other labor, there is every probability that these industries would still further increase wage scales and the enormous production costs would soon make all industry unprofitable and industrial stagnation would result.

"We should endeavor to maintain our wage scales on the same level with other competitive industries, but the solution of the problem of labor shortage does not lie in uneconomic wage advances," Mr. Patterson said.

Increasing Output by Machinery and the Bonus

At this point Mr. Patterson suggested the increasing of units of production per man through labor-saving machinery and wage incentives. "I am satisfied," he said, "that many, if not all of our plants are, and have been for some time past, giving serious study to the creation of labor-saving devices, and I am convinced that existing labor conditions will result in the greatest advancement in mechanical inventions that the industry has ever known."

Turning to the question of human relations, Mr. Patterson declared that able and humane superintendents and foremen, agreeable, safe and sanitary working conditions are equally as attractive to men as wages.

"But," he continued, "if we are able to increase the earning capacity of our workmen, without a corresponding increase in our operating costs, then we have gone a long way toward overcoming the wage handicap with which the steel industry is burdened today, and I believe that that handicap can be overcome by a scientific and economic application of the principles of tonnage and bonus payments."

Returning to the subject of immigration, Mr. Patterson expressed the opinion that central employment offices, such as are operated by the National Metal Trades and the National Founders Association could be maintained in the larger cities of the country, and such applicants for jobs as come in could be distributed to the different plants, pro-rated according to the size of the plants or the number of mills operated. He also suggested the idea of establishing employment offices at ports of debarkation.

Many of the mills are importing negroes from the South, it was said, "and it is probable we shall have to depend upon colored labor to a far greater extent than we have in the past." Mr. Patterson said that the irregularity of work performed by a negro can be largely overcome by paying him on a standard time bonus basis, or by pitting one gang of negro workmen against another, offering some financial inducement to the gang who first completes their task. The possibility of obtaining English-speaking Mexican labor was also suggested but not particularly recommended.

Wages on a Tonnage Basis

Speaking on "Tonnage Rates," Second Vice-President Samuel Davey of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, declared that the adoption of this system by his company had brought about lower costs and decreased the labor turnover, despite wage advances of 25 to 30 per cent, as compared with conditions existing under the hourly pay system. Mr. Davey

said it was necessary to consider the cost per ton more than the wages paid to employees in order to bring about maximum production at a minimum cost.

"We are being importuned more, I believe," said Mr. Davey, "right now for production than we have ever been before. Even in war times we were not as hard pushed as we are at the present time." Mentioning the benefit derived from offering inducements to workmen through the tonnage system, Mr. Davey called attention to the fact that despite the restriction of labor supply, sheet production for the first quarter of this year broke all records, a point previously made by Mr. Horner. He said that this shows either a wonderful increase in managerial efficiency or an increase in the efficiency of some or all of the workmen.

Mr. Davey said he did not claim that the tonnage system had solved the labor problem, but that he knew the labor turnover has been lower since adopting this plan.

"It is true," he said, "that some education of both foremen and workers and much study was necessary, and that the hardest problem was to get the confidence of the men of the various departments, but once convinced that it was their productive ability and not their time we wished to pay for, the rest was easy."

International Harvester Industrial Plan

"Constructive Management Policies" was discussed most interestingly and informatively by Arthur Young, manager of industrial relations, International Harvester Co. He explained at some length the operation of the Harvester industrial council plan adopted by his company in 1919. Since that time, it was stated, the Harvester company has had only one break in operations due to labor trouble, and it was of only brief duration, and was settled through cooperation between the management and the works council, "the heart and core" of the plan. Mr. Young also explained the medical service of the company, by which employees are examined by physicians before being accepted for employment. They are then rated as to their physical condition and assigned to jobs to which they are adapted, and are placed in close personal contact with the foremen and through them with other workers; their work and its significance to society are fully explained and a general policy adopted of developing the human education. Mr. Young made it plain that the plan had brought about remarkably favorable results in holding down costs, in increasing production per man, and in avoiding labor trouble, the men themselves being allowed to select by votes members of the works council which settles disputes and constructively develop better practices in cooperation with the management.

The centralized plan of employment rather than the old method of indiscriminate employment was urged, it being stated that control of labor is as important as control of supplies of material.

"Present day personnel work is neither entirely new nor revolutionary," said Mr. Young. "It is the logical, evolutionary adaptation of age-old principles to meet the changed conditions of industry and society following the advent of big business." It was declared that the development of personnel work is not complete and even in those plants where the greatest advances have been made, in the organization of human relationships, it is not an exact science. It was explained that policies and practices which are entirely successful in a given corporation or circumstance may fail utterly if transplanted bodily to other corporations or conditions. Because of this Mr. Young suggested that careful study be given by each corporation to its own problems before adopting a plan of industrial cooperation.

"The vast changes in the form of ownership, private to corporate, and size of industrial units," said Mr. Young, "which have characterized American business in the past three decades are most dramatically presented in the iron and steel industry."

"Just as in purchasing, engineering or other branches of the art, expansion into larger and larger units has called for organized, systematic procedure, so too have our human relationships changed from individual to mass problems. Personal contact between

owner and employee has given way to 'systems' and 'plans.' Far more danger attends this transition of human relationships, as regards the political and social well-being of the nation, than is the case with things material."

Restricted Immigration. Not Unmixed Evil

"It is providential that we can't get as many men as we might want from Europe because of the mental condition of men over there," declared Philip Stremmel, general superintendent of the National Enameling & Stamping Co., Granite City, Ill., in discussing the topic, "Training Men." He asserted that it is dangerous for American industry to accept European labor today, in view of its radical character.

"But instead," he continued, "we are thinking more about training men. First, it is essential to train the worker to understand quality and better quality. Men are doing slipshod work. It is necessary to have quality in order to do business.

"Next, it is necessary to train workers for greater production. We have increased greatly the output per man since adopting the tonnage basis, replacing the hourly or day basis of pay. Train men to get cheaper costs."

Responsibility for the training of men lies with the foremen, who must know the workers, as Mr. Young suggested, it was declared by Mr. Stremmel. Foremen must develop leadership and know thoroughly the product out of which material is made, and machines used in production. Assuming a position as leader and teacher, it was declared, foremen must be able to instruct men working under them and inspire the men with high ideals.

Portent of Radical Literature

The widespread character and baneful influence of radical literature which is reaching the homes of workers was discussed with the use of rather startling figures by Mr. Stremmel, who said executives should know the sort of literature that the average worker is reading. He said it was "simply awful." There are 4,300,000 copies of monthly publications issued by unions which are reaching homes of workers, it was said, and 2,000,000 copies of radical publications reaching homes of workers each month, as compared with

only 100,000 monthly copies of publications presenting the side of industry. Propaganda was declared to be responsible for many untoward developments associated with labor unrest. Unions were credited with spending \$120,000,000 annually in connection with propaganda, as against only \$16,930,000 by industries, and \$7,000,000 by business organizations, such as trade associations. And the public is spending nothing, said Mr. Stremmel.

Training of men was urged as one means of counteracting sinister tendencies, but at the door of management was laid responsibility for training of foremen in order that the latter may train their workers. It was insisted that managers have been "woefully weak" in training foremen. The importance of personal contact between executives and employees was emphasized.

"Because of the mental condition of men in the plants today," said Mr. Stremmel, "it is more important than ever that we have trained foremen who can lead, teach, hold down labor turnover, inspire high ideals, and it is necessary that the foremen have the cooperation of the executive."

In closing the second day's meeting Mr. Hook said: "At the beginning of this session we asked ourselves this question: In the face of intense competition within our industry and the drawing power of building and other trades, how can we procure, hold and train a sufficient number of men to operate our plants?"

"It seems to me the question has been answered as follows:

"Increased output per man through scientific study, followed by the installation of sound wage incentives which compensate for increased efficiency.

"Further reducing the number of men needed per unit of production by use of labor-saving devices.

"Increased individual efficiency and morale by adoption of carefully thought-out and conscientiously managed policies covering working conditions, and the relationship between the management and those who do not have management responsibilities."

Problems and Policies in Selling and Distributing

PRESIDING over the session of the third day, devoted to distribution, G. H. Charls, vice-president and general manager of the United Alloy Steel Corporation, Canton, Ohio, opened the meeting with an address on "Trade Extension Through Advertising" and pointed out that the association has been almost unanimous in the opinion that the sheet industry should put forth a joint effort to educate the public to the advantages of sheet steel. A widespread advertising campaign was urged as beckoning the way to steadier employment, stabilization of purchases and greater prosperity through increased demands for sheet steel. He said it was for the industry to have confidence in its product and to heed the cry of the hardware association, metal workers of America and others who have urged the sheet producers to institute a national campaign to increase demand for their product.

National Advertising Campaign by Association

It was pointed out that many associations have launched successful national advertising campaigns for the use of their products, among them the cement association, the Paint Manufacturers' Association, the Indiana Limestone Association, the Lumber Association, the Copper and Brass Research Bureau, the Metal Lath Association, and others.

"Since we started the talk about this subject," said Mr. Charls, "the prepared roofing manufacturers through their hard hitting publicity have succeeded in displacing 1,000,000 tons of steel roofing annually. We have witnessed the onslaught of beaver board, and gypsum products against metal lath and metal ceil-

ings. The fabricators of our sheets into these products, hard pressed and left alone, are trying in a small but earnest way to withstand the attack. Why should we who are the most vitally affected leave the battles to them?"

"We have seen aluminum displacing enamel ware, fiber pushing out many steel fabricated products. Nickel and monel metal, copper and zinc are being advertised generously to supplant sheet steel. Aluminum is displacing automobile body sheets. A low priced, popular automobile is being built with an aluminum body, 750 of these cars being produced daily.

"The inroads made by many of these competing products into the realm formerly held by steel can never be regained. Does that not bring home the fact that an ounce of prevention in this case is worth a ton of cure? The need today is to create new business. Competitors are cooperating to educate the public to use their product in place of steel sheets. We must unite to offset this more or once again we will see cooperative effort win out. It always does. Every day we delay, a full realization of just what is happening and how to meet it is making the future task that much harder."

To Prevent Wide Fluctuations in Demand

Calling attention to the necessity of stabilizing purchases of steel to prevent the wide fluctuation of demand, so as to insure steady production and employment, Mr. Charls said that national advertising will help this situation. Such advertising, it was pointed out, will mean the assembling of information never

before assembled, analysis of the seasonal requirements of all the trade, and education of the trade to buy at the proper time. A great deal of discussion was made on this point which was associated with the report of the Hoover committee on the business cycle, the report being warmly approved as a sound effort to wipe out peaks and valleys in business.

"The automobile industry has found that it is wise and beneficial to purchase sheets in the season when mills are not rushed," said Mr. Charls. "This policy I know, by word of mouth, governed the policy of some of the largest companies in America this last winter. In like manner other seasonal trade can be educated to do likewise. If this is done the demand will in time become steadier. There will not be such wild scrambling for sheets with the resultant excessive prices which create the buyers' strikes and in this way the depression periods would be shortened and lightened."

Mr. Charls said that the sheet industry can show buyers when to purchase and help them to merchandise its products by creating demand at the proper time through national advertising. It was suggested by Mr. Charls that it would be advantageous to paint and zinc manufacturers to see the benefit of their advertising and pushing sheet steel, and to let every housewife know what sheet steel is and how it is suitable to her requirement in the home construction and its equipment.

In discussion touching on the steadying of production and elimination of peaks and valleys, W. L. Latta, sales manager of the Whitaker-Glessner Co., suggested that such work be taken up by the association and placed in charge of an able man who also would take up research work looking to development of new avenues for the use of sheet steel. Mr. Horner replied that the association is considering such a plan.

Not Much Exports for Years to Come

The opinion that the United States will not be a great exporting nation for years to come, except of agricultural products, was expressed by R. C. Phillips, secretary American Rolling Mill Co., who recently returned from an extensive trip abroad during which he visited South America, Australia, Java, Philippine Islands, Japan, and the West Indies. His paper on "Foreign Trade" was based on the trip he made, occasion being taken to recite trade possibilities for American sheet producers in the countries visited. The chief trade prospect he said was in South America. To develop trade properly in South American countries dealt with, including Brazil, Argentina, and Chile, Mr. Phillips emphasized the need of cultivating close acquaintance with the people of those countries, of properly packing shipments, of extending credits, and meeting other demands such as England in particular is meeting. Remarks in a similar strain were applied to the West Indies and Mexico was declared to be possibly one of the biggest customers of the future.

"Australians," said Mr. Phillips, "are more like Americans than Canadians are and I think Australia will be an independent country one of these days. The British are cultivating the sheet and other markets in Australia where they carry large stocks of sheets and plates and also conduct a propaganda against importing American sheets." Mr. Phillips said that despite these facts and the preferential tariff rates on British products, there is a good opportunity to develop the sheet market in Australia for the American mills.

Java, with a population of 36,000,000, was declared also to be a British market where 25,000 tons of sheets are consumed annually, but where consumption will increase because of demand that will develop for light gage corrugated galvanized sheets for houses and flumes required in connection with irrigation projects. Also it was stated it is planned to electrify railroads in Java and this also will call for greater tonnages of sheets.

Irrigation and railroad development in the Philippines also will call for tonnages in that country, which now imports steel and machinery from the United States in greater quantities than from other countries, Mr. Phillips said, and he expressed confidence that this will continue even if the Philippines are granted their independence. China offers one of the greatest chances

for American steel, it was declared, because the United States never exploited that country and Americans are liked there in consequence. China, it was said, is gradually opening up as a world market and is emerging from its traditional seclusion. Japan was said to offer a good field for certain productive lines, but it was asserted that it is difficult but necessary to understand the Japanese.

However, Mr. Phillips said that the domestic markets have not reached their full growth and expressed doubt that much money had been made by the steel industry in export trade during the past five years, except through shipments of war material. Then, he said, it was necessary for Americans to loan money in order for Europe to "pay us and we had to tax ourselves to make the loans. We gained a certain reputation, but have been called hard names." Mr. Phillips predicted that the United States might become a member of the International Court of Justice, but said the people of this country will never again fight abroad to save boundary lines.

"The development will be in South America," said Mr. Phillips. "Let's try to create markets there, cultivate and become friendly with the people and gradually a great market will open and we can forget Europe."

Policies in Selling

The three-fold performance of standardizing, harmonizing and stabilizing was emphasized as being necessary to develop sound policies of selling and distributing by C. O. Hadly, general manager of sales of the Alan Wood Iron & Steel Co., Philadelphia, in speaking on "Standardization of Selling Policies and Distributing Methods." He urged reasonable cooperation between these three elements, which were declared to be the greatest assets an industry can have. The essential requirement of accurate and adequate trade information also was stressed as it applies to both selling and distributing. Definite administrative practice, he pointed out, must supplant destructive and reckless policies.

One idea of establishing a standardized selling policy, it was declared, is to prevent pyramiding of orders. The difficulty in standardizing, said Mr. Hadly, is due to the cross currents in selling and to the human element. Because of the diversity of practice, it was stated that there is a great deal of economic, physical and mental waste. He paid tribute to the National Association of Sheet and Tin Plate Manufacturers for its achievements through sound selling policies and distributing methods. He suggested that the association might work out a formal plan relating to the subject's being dealt with combined with consideration for customers and employees. Mr. Charls subsequently suggested that a committee be selected for this purpose for the benefit of the sheet trade.

"Exercise courage and common sense," said Mr. Hadly, "and be as careful of the policies we adopt as of their standardization."

Legal Side of Interstate Business

Subject to certain constitutional limitations, the power of the State to exclude corporations from their boundaries unless they were properly registered was explained by General Counsel Thomas D. McCloskey of the National Association of Sheet and Tin Plate Manufacturers. He pointed out the necessity of corporation knowing from court decisions or learning from legal counsel, the fine lines distinguishing intrastate business from interstate business and the penalty of a corporation's doing business in a "foreign" state where it is not registered. The bearing this has on selling was developed at some length and was the subject of considerable discussion, most of it of a legalistic nature.

Concluding remarks were made by Robert D. Campbell, vice-president of the Allegheny Steel Co., who felicitated those in charge of the convention for its success. He said it was a happy conception to combine business with pleasure and said that the character of the meeting, the papers and discussion was of an extraordinarily high type and had proved beneficial to all who attended. Upon motion of R. C. Kirk, vice-

president and treasurer of the Follansbee Brothers Co., a vote of thanks was extended to Mr. Carroll as chairman of the general convention committee and to its other members for their good work in preparing the program. Mr. Horner was then called upon and thanked those present for their cooperation resulting in making the convention an unusual success.

Those in Attendance

Those attending the convention were: W. W. Lukens, vice-president, and C. O. Hadly, general manager sales, Alan Wood Iron & Steel Co., Philadelphia; R. D. Campbell, vice-president and treasurer, and J. O. Carr, vice-president Allegheny Steel Co., Brackenridge, Pa.; J. H. Frantz, first vice-president; C. R. Hook, vice-president and general manager; R. C. Phillips, secretary; C. W. Verity, treasurer, and W. W. Sebal, assistant general manager sales, American Rolling Mill Co., Middletown, Ohio; A. M. Oppenheimer, president, Apollo Steel Co., Apollo, Pa.; Paul Mackall, assistant general sales agent, Bethlehem Steel Co., Bethlehem, Pa.; H. W. Edwards, vice-president, and G. D. Myers, treasurer, Canonsburg Iron & Steel Co., Canonsburg, Pa.; R. E. Beeb, chairman; F. J. Griffiths, president; and B. F. Fairless, vice-president, Central Steel Co., Massillon, Ohio; Paul Wick, vice-president, Falcon Steel Co., Niles, Ohio; W. U. Follansbee, president, and R. C. Kirk, vice-president and treasurer, Follansbee Brothers Co., Pittsburgh; W. C. Carroll, vice-president, Inland Steel Co., Chicago; H. D. Westfall, vice-president, LaBelle Iron Works, Wheeling, W. Va.; J. D. Waddell, president, Mahoning Valley Steel Co., Niles, Ohio; W. H. Davey, president; Samuel Davey, vice-president and general manager; F. W. Beach, general manager sales; A. J. Balliett, director, and

L. D. Rockwell, district representative, Mansfield Sheet & Tin Plate Co., Mansfield, Ohio; C. A. Irwin, president, Milwaukee Rolling Mill Co., Milwaukee; W. S. Horner, president; W. W. Lower, secretary-treasurer; C. L. Patterson, secretary labor bureau, and T. D. McCloskey, general counsel, National Association of Sheet and Tin Plate Manufacturers, Pittsburgh; Philip Stremmel, general superintendent, National Enameling & Stamping Co., Granite City, Ill.; J. B. Andrews, vice-president, Newport Rolling Mill Co.; J. H. Fitch, Jr., vice-president, Newton Steel Co., Youngstown, Ohio; George Bartol, president, and J. G. Carruthers, general manager sales, Otis Steel Co., Cleveland; C. F. Niemann, president, Parkersburg Iron & Steel Co., Pittsburgh; H. C. Greer, president, and A. J. Krantz, treasurer and general manager, Reeves Mfg. Co., Dover, Ohio; W. B. Topping, general manager sales, Republic Iron & Steel Co., Youngstown; K. L. Griffith, general manager, and A. T. Hunt, manager of sales, Seneca Iron & Steel Co., Buffalo, N. Y.; Severn P. Ker, president, Sharon Steel Hoop Co., Sharon, Pa.; H. A. Roemer, vice-president and general manager, and R. L. Williams, assistant general manager, Superior Sheet Steel Co.; W. M. McFate, vice-president, Trumbull Steel Co., Warren, Ohio; G. H. Charls, vice-president and general manager; L. D. Mercer, general manager sales, and J. N. Remsen, assistant general manager sales, United Alloy Steel Corporation, Canton, Ohio; Julian Burdick, president, West Penn Steel Co.; G. W. Moore, vice-president; W. L. Latta, sales manager, and J. E. Montgomery, general superintendent, Whitaker-Glessner Co., Wheeling, W. Va.; W. A. Thomas, former president, Brier Hill Steel Co., Youngstown; C. S. Thomas, former president, DeForest Sheet & Tin Plate Co., Niles, Ohio.

Chicago & Northwestern Railroad Inquiry for Machine Tools

The Chicago & Northwestern has issued the following inquiries for 49 machines, in addition to the list of nine items published in THE IRON AGE of March 29:

- One 13-in. swing belt-driven sensitive drill.
- Two belt-driven and one motor-driven 50-ton, 36 x 72-in. driving box presses.
- One belt-driven water tool grinder with 20-in. single wheel.
- One belt-driven hot saw and tube expanding machine for superheater tubes.
- One 2½-in. single bolt cutter.
- Two 16-in. engine lathes, 3-ft. between centers.
- One Underwood No. 22 or equivalent, portable valve seat rotary planer.
- One motor-driven automatic flue safe ending machine.
- One motor-driven 1½-in. triple staybolt cutter.
- One motor-driven 18 x 3-in. emery wheels grinder.
- One motor-driven 20 x 2-in. single wet emery grinder.
- One belt-driven 24-in. x 11-ft. engine lathe.
- One electric floor grinder.
- Three motor-driven 36-in. table drill presses.
- One 18-in. x 8-ft. engine lathe arranged for motor drive.
- Three motor-driven 30-in. x 30-in. x 8 ft. planers.
- One motor-driven 42-in. triple geared engine lathe, 11 ft. 6 in. between centers.
- One motor-driven ¼ to 2-in. pipe machine, No. 2 Bignal & Keeler Peerless or equivalent.
- One motor-driven 30-in. x 12-ft. engine lathe.
- One motor-driven 24 x 24-in. x 6-ft. single head planer.
- One motor-driven power hack saw, Marvel No. 4 or equivalent.
- One motor-driven 52-in. boring mill.
- One McCabe or equivalent portable flanger to handle ½-in. cold material 6½ in. flange.
- One motor-driven 26-in. crank shaper.
- One motor-driven 22-in. x 11-ft. between centers engine lathe.
- One motor-driven No. 2 Universal or equivalent cutter, drill and tool grinder.
- One motor-driven ¼ to 2½ in. pipe machine, No. 50 Williams or equivalent.
- One motor-driven Ransom No. 35 or equivalent double end dry grinding machine.

One Underwood or equivalent 4-in. x 8-ft. portable cylinder boring bar.

One motor-driven 25-in. x 12-ft. engine lathe.

Two motor-driven 1½ in. automatic multiple spindle screw machines.

One 60-ton pneumatic single pressure spring banding press, equipped with assembling table.

One motor-driven heavy duty high-speed riveting hammer, similar to No. 3A of High-Speed Hammer Co.

One motor-driven No. 3 Atkins or equivalent metal band saw.

One motor-driven 30-in. x 18 ft. engine lathe.

One motor-driven 42 x 42-in. x 8 ft. double head planer.

One motor-driven 30 x 30 in. x 10 ft. planer.

One motor-driven 18 in. x 12-ft. engine lathe.

One motor-driven 5 ft. semi-universal radial drill.

One motor-driven 30-in. x 18 ft. medium pattern high duty engine lathe.

One motor-driven 24 x 24 x 24-in. high duty crank planer.

Inquiries for 10 additional machines have been received from the Santa Fé making a total of 74 items on the list which that road has put out. The additions are as follows:

One belt-driven Lodge & Shipley or equivalent heavy duty type, 30-in. x 14-ft. engine lathe.

One 20-in. x 10-ft. heavy duty type Hendey or equivalent engine lathe.

One belt-driven 24-in. sensitive drill.

One pipe and nipple threading machine with right hand dies for standard pipe from 1¼ to 6 in.

One 24-in. x 12 ft. engine lathe for tool room work.

One 1800-lb. single frame steam hammer.

One motor-driven 42-in. car wheel boring machine.

One motor-driven Niles or equivalent 102-in. vertical boring and turning machine.

One 2¼ in. x 24 in. hollow spindle flat turret lathe.

One Sellers or equivalent 42-in. vertical boring and turning mill.

The following contracts have been awarded on the Bay City, Mich., water improvement project; contract for piping and boilers, \$59,897, and heating system, \$19,417, to the Grinnell Co., Detroit; contract for filter plant equipment, \$118,971, to the M. L. Baynard Co., Philadelphia; contract for pumping machinery to the Dravo-Doyle Co., Cleveland.

Machinery Markets and News of the Works

MORE RAILROAD INQUIRY

Santa Fe in the Market for 64 Machine Tools Markets Are Quieter and Signs Now Are That April Business Will Not Exceed That of March

While there has been a let-up in machine-tool buying this month, there is still a good deal of business from some quarters. The railroads appear as continuous buyers, and the automobile industry, still straining from unusual production records, is taking a good many machines.

The Santa Fé Railroad came into the market at Chicago a few days ago for 64 machines of various types, and this is said to be only a part of its requirements, the remainder to be inquired for soon. This road has in contemplation the erection of a large shop

at San Bernardino, Cal., which if built will require considerable additional equipment. The Chicago, Burlington & Quincy is in the market for \$40,000 to \$50,000 worth of jib cranes, trolleys, hoists, etc., for its Denver shops. The New York, Ontario & Western has purchased about half of the 15 machines it recently inquired for, and the Central Railroad of New Jersey is in the market for a half dozen machines, including a large driving wheel lathe. The Chicago and North Western has issued inquiries for 49 machines in addition to the nine items published in *THE IRON AGE* of March 29. This list will be found on page 1232.

The General Electric Co., Schenectady, N. Y., is again inquiring in a large way for tools, this company having been one of the largest and most regular buyers in the East since the first of the year. Among industrial companies there is a very good demand for radial drills.

New York

NEW YORK, April 24.

ATAPERING off in machine-tool orders, at least in some lines, is definitely noticed by representatives of a number of large machine-tool builders. Dealers who are doing a general business in a wide line of standard tools, including second-hand machines, state that their total volume is holding up pretty well, though there is some doubt that sales will go over those of March. The business done last week consisted mainly of single-tool orders, among which were quite a few for large machines. Railroad buying is conspicuous. The New York Ontario & Western, which a few weeks ago inquired for about 15 tools, has bought about half of this number. The Pennsylvania Railroad has bought three flue-shop outfits. The Central Railroad of New Jersey is inquiring for a driving wheel lathe, a planer, a radial drill and two or three engine lathes. The demand for radial drills is good. The Westinghouse Electric & Mfg. Co., East Pittsburgh, has bought two 6-ft. radials; the American Locomotive Co., New York, a 5-ft. radial; the Bucyrus Co., South Milwaukee, Wis., a 6-ft. radial, and the De La Vergne Machine Co., New York, a 5-ft. radial. The M. W. Kellogg Co., Jersey City, has bought a 12-ft. boring mill.

The General Electric Co. is in the market for a large number of machines for its Schenectady and Erie plants, one of its inquiries of the past week calling for about 20 tools. Other inquiries bring the total up to 40 or 50 machines. The General Electric Co. has been one of the largest and most consistent buyers in the East since the first of the year.

An ice-manufacturing and refrigerating plant, and complete electrical department will be installed in the new seven-story market terminal, 310 x 330 ft., to be constructed at Cromwell Avenue and the Harlem River by the Department of Public Markets, Room 2337, Municipal Building, New York, for which plans are being prepared. It will cost in excess of \$5,000,000 with equipment. Edward J. O'Malley is in charge.

Trever F. Jones & Co., 374 West Broadway, New York, manufacturers of brass signs, etc., plan the installation of

a metal saw with tilting table, and an 8 ft. shear, foot-operated.

A manual training department will be installed in the new two-story high and grade school, 78 x 58 ft., to be erected at Northport, N. Y., estimated to cost \$275,000, for which bids will soon be called on a general contract. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

Officials of the Cole Metal Products Co., 330 East Twenty-third Street, New York, have organized the Arrow Wire Frame Corporation as a subsidiary organization to manufacture wire goods.

The Adirondack Power & Light Corporation, 511 State Street, Schenectady, N. Y., plans a new power house on the Schenectady-Albany Road, to cost about \$80,000.

T. H. Williams, Deveraux Block, Utica, N. Y., architect, is preparing plans for a two-story machine shop, 35 x 80 ft., estimated to cost \$50,000, for which the owner's name will soon be announced. Bids will be called late in May.

Officials of the Clco Products Corporation, 41 East Forty-second Street, New York, have organized the Gasometer Corporation, a subsidiary, to manufacture instruments and measuring devices.

The American Manufacturers' Export Association, 160 Broadway, New York, has received an inquiry from a company at Budapest, Hungary, which desires to get in touch with American manufacturers of wood-working machinery and tools, file A-1635.

Bids will be received by J. A. Wetmore, acting supervising architect, United States Treasury Department, Washington, until May 8, for one new horizontal, smokeless fire-box boiler and auxiliary equipment, for installation at the power house of the United States Post Office Department, Saratoga Springs, N. Y.

Ovens, power equipment, electrical and other apparatus will be installed in the new six-story baking plant, 100 x 100 ft., to be erected by Cushman's Sons, Inc., 461 West 125th Street, New York, on Lawrence Street, estimated to cost \$150,000. L. S. Beardsley, 116 West Thirty-ninth Street, is architect.

The General Petroleum Co., 71 Broadway, New York, is planning the construction of additional storage and distributing plants at its various properties, to cost more than \$2,000,000. A note issue of \$10,000,000 is being sold for this and other expansion.

The Cohoes Power & Light Corporation, Cohoes, N. Y., plans for the installation of a new generator and other equipment at its power plant, to increase the capacity about 10,000 hp.

The Crane Market

Few new inquiries for electric traveling cranes have appeared in the past week and a similar dullness generally prevails in the locomotive crane market. Builders of hand power cranes report some export activity, particularly from Cuba, where users of hand power cranes are evincing an interest in electric drives on equipment now in operation. Sales of electric hoists and chain blocks continue fairly large. Among current inquiries is one from the Replogle Steel Co., 120 Broadway, New York, for a 1½-ton jib crane, whether hand power or electric not stated. The General Electric Co., Schenectady, N. Y., has issued an inquiry for another 2-ton overhead traveling crane, for Pittsfield, span 17 ft. The previous inquiry was for a 2-ton, 30-ft. span crane. The Southern Pacific Co., 165 Broadway, New York, is accepting bids on a 20-ton, 31-ft. span, gantry crane. The Metal & Thermit Corporation, 120 Broadway, New York, which has decided not to buy the 75-ton crane included in its recent list of 5 overhead cranes for the Pacific Coast, has placed the 40-ton crane with the Shaw Electric Crane Co., and will probably award the two 15-ton and one 10-ton cranes to a Pacific Coast builder.

Among recent purchases are:

Metal & Thermit Corporation, 120 Broadway, New York, a 40-ton electric traveling crane from the Shaw Electric Crane Co.;

Witherbee, Sherman & Co., 2 Rector Street, New York, a 60-ton, 48-ft. span overhead traveling crane for Port Henry, N. Y., from the Whiting Corporation;

Phoenix Utility Co., 61 Broadway, New York, a 36-ton, 1 motor overhead crane from the Whiting Corporation, leaving a 60-ton overhead crane still to be purchased;

St. Lawrence Transmission Co., Potsdam, N. Y., a 15-ton, 40-ft. span hand power crane from the Whiting Corporation;

Florence Pipe Foundry & Machine Co., Florence, N. J., a 25-ton used industrial locomotive crane, purchased locally;

York Haven Water & Power Co., York Haven, Pa., a 20-ton, 3-motor overhead traveling crane, from the Northern Engineering Works;

Central Supply Co., Little Rock, Ark., a 3-ton, 50-ft. span, 3-motor overhead traveling crane, from the Northern Engineering Works;

John Dollinger, Jr., Beaumont, Tex., a 10-ton, 71-ft. span, 3-motor overhead traveling crane, from the Northern Engineering Works;

P. Stuart & Co., Newton, Mass., three 20-ton locomotive cranes, from the Browning Co.;

Silberman Brothers, Harrisburg, Pa., iron and steel scrap, a 20-ton locomotive crane, from the Browning Co.;

Brooklyn Edison Co., Brooklyn, N. Y., a locomotive crane to handle a 5-cu. yd. bucket at a 50-ft. radius, from the Brown Hoisting Machinery Co.;

J. G. White Engineering Corporation, 43 Exchange Place, New York, a 15-ton locomotive crane, from the Ohio Locomotive Crane Co.

The Chicago, Burlington & Quincy is inquiring for jib cranes, trolleys, hoists, etc., for its Denver, Colo., shops, which will involve an expenditure of from \$40,000 to \$50,000.

H. D. Conkey & Co., Mendota, Ill., have received a contract for 11 hand-power underhung traveling cranes, including runway material and hand-power hoists, for the new plant and warehouse of the Westinghouse Electric & Mfg. Co., Thirty-ninth and Leavitt Streets, Chicago. The same builder has taken an order from the Buick Motor Co., Flint, Mich., for 50 "Conco" trolleys.

Republic Carbon Co., Niagara Falls, N. Y., has placed a 7½-ton, 76-ft. 9-in. span crane with the Milwaukee Electric Crane & Mfg. Co.

West Penn Power Co., Pittsburgh, has placed a 3-ton special bucket trolley for its Connellsville, Pa., power plant with the Barber Foster Co.

A manual training department will be installed in the new high school to be erected at Cairo, N. Y., two-stories, 80 x 112 ft., estimated to cost \$70,000. George Tupper, 5 Walling Avenue, Oneonta, N. Y., is architect.

The Long Island Lighting Co., 50 Church Street, New York, has acquired the Queensborough Gas & Electric Co., operating at Lawrence, Inwood, L. I., and vicinity. Extensions and improvements will be made to the power plant and system. A preferred stock issue of \$1,000,000 is being sold to cover the purchase and expansion.

The Gilliland Oil Co., 111 Broadway, New York, recently reorganized, is arranging for a bond issue of \$10,000,000, of which \$5,400,000 will be used for plant extensions and improvements, including the installation of additional equipment, and for the purchase of new properties. The company has entered into a 10-year contract with the Atlantic Oil & Producing Co. for furnishing oil. J. P. Hurley, heretofore receiver for the company, has been elected president and general manager.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, is having plans drawn for an addition to its refinery at Bayway, Elizabeth, N. J., for filtering, barreling and other service, estimated to cost \$300,000 with machinery.

Theodore Blank, Porchtown, N. J., has acquired lake property at Porchtown and Malaga for the construction of a hydroelectric power plant for light and power service at Franklinville and vicinity. Work will commence at once.

The Borough Council, Freehold, N. J., H. M. Burke, borough clerk, will take bids until May 1 for fuel oil engines, pumping machinery and air compressors, with two 8000 gal. fuel oil tanks, for the municipal waterworks. Charles A. Niles is borough engineer.

H. M. Nelson & Co., 248 Thomas Street, Newark, manufacturers of machinery for boiler and plate shops, have purchased adjoining property at 242-46 Thomas Street for expansions.

The Eberhard Faber Rubber Co., 202-14 New Street, Newark, has awarded a contract to Edward M. Waldron, Inc., 27 Central Avenue, for a four-story and basement, reinforced-concrete addition, 60 x 103 ft., estimated to cost \$75,000.

The American Can Co., 120 Broadway, New York, will build three concrete additions to its plant on Elizabeth Avenue, Newark, to cost \$60,000, \$30,000 and \$10,000, respectively.

New England

Boston, April 23.

THE purchase of a 110-ton Niles crane by Stone & Webster for the Weymouth plant of the Edison Electric Co., Boston, and two used Flather and about a dozen new machines for a new school at Laconia, N. H., were outstanding features of another quiet machine tool market the past week. Some increase in the number of individual tools sold over the previous week is noted, but the improvement is very slight. A better showing would have been made had it not been for an intervening holiday in the local market. The Boston & Maine Railroad Co. is reported as about to close on a 1200-lb. steam hammer. The Boston Elevated Railway Co. on three or four small shop tools, and approximately 15 industrial plants on about as many individual pieces of equipment. The outlook for immediate business does not appear particularly bright, although several hundred quotations are in prospects' hands.

The Elliott Addressing Machine Co., Cambridge, Mass., is building an addition, practically doubling its floor space.

Construction has started on a three-story, 14 x 50 ft. factory on Newberne Avenue, Somerville, for F. B. Horsman, 34 Francesca Avenue, West Somerville, machinist.

Work will shortly start on a one-story, 36 x 144 ft. repair shop contemplated by the Mexican Petroleum Corporation, Eastern Avenue, Chelsea, Mass.

An architect has been selected to draw plans for a four-story plant for the Fall River Steam & Gas Pipe Co., Bedford and Sixth Streets, Fall River, Mass., to replace that recently destroyed by fire.

Bids have been accepted by the New Hampshire Gas Light Co., East Chapel Street, New Haven, Conn., on a proposed two-story, 57 x 139 ft. boiler house.

The Boston Elevated Railway Co., Massachusetts Avenue, Boston, will accept bids until May 7 for four machine and repair shops to be erected in Everett, Mass.; one, 150 x 360 ft.; another 107 x 360 ft., and two, 52 x 53 ft.

The Union Hardware Co., Torrington, Conn., has awarded

contract for the construction of a two-story, 102 x 193 ft. plant on Migeon Avenue, to cost approximately \$100,000.

The Central Maine Power Co., Rockland, Me., proposes to erect at Union, Me., a power house equipped with a 3500-hp. generating unit, and to make other improvements to cost from \$300,000 to \$350,000.

Contract has been awarded by Jenkins Brothers, Inc., Bridgeport, Conn., manufacturer of valves and other steam specialties, to the John W. Ferguson Co., Paterson, N. J., for its four-story addition, 72 x 175 ft., estimated to cost \$250,000, with machinery.

The Central Oil & Gas Stove Co., Gardner, Mass., will soon take bids for a three-story and basement building, estimated to cost \$40,000. G. Adolph Johnson, 403 Main Street, Worcester, Mass., is architect.

The New Method Die Co., 100 Sudbury Street, Boston, plans the installation of a circular power saw, wire stitcher and other equipment.

A manual training department will be installed in the three-story high school to be erected at Belfast, Me., estimated to cost \$150,000, for which bids will be asked on a general contract early in May. Kilham, Hopkins & Greeley, 9 Park Street, Boston, are architects.

The Edison Electric Illuminating Co., 39 Boylston Street, Boston, has awarded a general contract to Stone & Webster, Inc., 147 Milk Street, for a steam-operated electric generating plant at Weymouth, Mass., to cost \$5,000,000 with machinery.

The Portland-Nash Co., Portland, Me., local representative for the Nash automobile, is planning for the erection of a three-story service and machine shop to cost approximately \$100,000.

The Oxford Paper Co., Rumford, Me., plans for extensions and improvements in its mill and the installation of additional machinery, estimated to cost \$300,000.

A manual training school will be installed in connection with the proposed two-story high school at Vernon, Conn., estimated to cost \$400,000. The Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

The Twin State Gas & Electric Co., Brattleboro, Vt., has acquired the electric plant of the Lunenberg Mfg. Co., Lunenburg, Vt., used for local light and power service, and will make extensions and improvements.

The Tuska Electric Co., Homestead Avenue, Hartford, Conn., manufacturer of electrical equipment, has plans for a second-story addition, 30 x 70 ft., on a present one-story factory. Greenwood & Noerr, 847 Main Street, are architects and engineers.

The Farmington River Hydroelectric Co., Winsted, Conn., contemplates the erection of a new generating plant on the Colebrook River, to cost \$600,000. It also plans the erection of a power house near New Boston, Mass., to cost about \$160,000. R. P. Ward is secretary and treasurer.

The Board of Education, Hudson, Mass., is said to be arranging a list of machine tools and other equipment for installation in the manual training department at the high school.

The National Folding Box Co., Alston and Main Streets, New Haven, Conn., has revised plans for extensions in its plant to cost \$180,000. Westcott & Mapes, Inc., 207 Orange Street, is engineer. John W. Doyle is head.

The Wm. M. Crane Co., 16 West Thirty-second Street, New York, is in the market for a 36-in. planer, new or used, if in first class condition. Address care of Mr. Harris.

Philadelphia

PHILADELPHIA, April 23.

THE Pennsylvania Equipment Co., Norwood Station, Pa., is in the market for a second-hand 8000 to 12,000-sq. ft. surface condenser, suitable for 4000 kva. turbine, Georgia delivery.

The Eastern Machinery & Equipment Co., J. H. Wood, president, Commercial Trust Building, Philadelphia, has purchased property at Front Street and Kalghn Avenue, Camden, N. J. A warehouse will be erected on the site for the storage of machine tools and equipment.

The Norton Co., Worcester, Mass., manufacturer of grinding wheels and grinding machines, has established a branch sales office at 3208 Market Street, Philadelphia, following out its policy of selling direct to the trade. This makes the fourth of the company's American branches, the others being in New York, Chicago and Detroit. L. C. Griffin is in charge of the wheel sales at the Philadelphia office and Paul Hoffman in charge of machine sales.

The Pennsylvania Railroad Co., Philadelphia, has acquired the plant of the Standard Steel & Bearings, Inc., formerly

the Standard Roller Bearing Co., at Lancaster Avenue and Fiftieth Street, for \$400,000. The structures will be used by the railroad for auxiliary repair shops, following the removal of the plant of the Standard company to Plainville, Conn., where operations in the future will be concentrated.

The Robinson Iron & Steel Co., Manayunk, Philadelphia, operating a steel fabricating plant, will commence the erection of a one-story addition, 60 x 200 ft., to cost \$30,000.

A power house will be constructed at the new grain elevator of the Philadelphia & Reading Railway Co., Philadelphia. It will have a capacity of 2,500,000 bu. and is estimated to cost \$3,000,000. It will be electrically operated, with mechanical drying, conveying and other machinery.

The Glen Willow Ice Mfg. Co., 4517 Main Street, Manayunk, Philadelphia, has awarded a general contract to the Farrell Roth Construction Co., 1624 Spruce Street, for a new plant to cost \$40,000, exclusive of machinery.

The Board of Directors, School of Industrial Arts, West State and Willow Streets, Trenton, N. J., has authorized plans for an addition to the machine and mechanical shops to cost \$50,000. Frank F. Frederick is director.

The Ajax Rubber Co., Breunig Avenue, Trenton, manufacturer of automobile tires, will have plans drawn at once for a new works on property recently acquired at Toledo, Ohio, estimated to cost \$250,000. Horace De Lissier is chairman of the board.

The Crescent Armored Wire Co., North Olden Avenue, Trenton, has awarded contract to the Karno-Smith Co., Inc., Broad Street Bank Building, for the erection of an addition, 40 x 80 ft.

A manual training department will be installed in the proposed high school to be erected at Morrisville, Pa., for which a bond issue of \$120,000 is being arranged. The Board of Education is supervising plans.

The Harrisburg Light & Power Co., 22 North Second Street, Harrisburg, Pa., plans the erection of a one-story machine shop, 45 x 100 ft., in connection with a two-story operating building at Ninth and Walnut Streets, estimated to cost \$30,000.

A 4000-kw. steam-operated electric power plant will be constructed by the Margargee Paper Co., Modena, Pa., at its new plant at Edgely, Pa., with boiler installation to comprise four 600-hp. water tube units, with stokers, etc. The first unit of the paper mill, for which foundations are being laid, will comprise six buildings, and following the completion of this unit, another unit of like character will be built. The plant will cost \$600,000.

A manual training department will be installed in the two-story high school to be erected at Chaddsford, Pa., estimated to cost \$100,000, for which bids are being taken on a general contract. Ritter & Shay, North American Building, Philadelphia, are architects.

The Susquehanna Collieries Co., Commercial Trust Building, Philadelphia, plans to rebuild its coal washery at Nanticoke, Pa., destroyed by fire April 20 with loss estimated at \$150,000, including machinery.

Plans are under way for the erection of a power house at the factory of the Keystone Glue Co., Williamsport, Pa., estimated to cost \$200,000, with machinery. Automatic stokers and ash-handling equipment will be installed.

The Pennsylvania Power & Light Co., Allentown, Pa., has organized six subsidiary companies to operate in portions of Lackawanna, Wayne, Carbon, Luzerne, Monroe and Pike counties. It is proposed to build a generating plant near Hawley, Pa., to supply power for distribution to the six companies, to cost in excess of \$500,000.

The Tip Top Coal Co., Hazleton, Pa., is planning for the installation of additional machinery at its colliery.

A manual training department will be installed in the new two-story and basement high school to be erected at Bedford, Pa., estimated to cost \$70,000, for which bids are being taken on a general contract. Hersh & Scheller, Commerce Building, Altoona, Pa., are architects.

The New Jersey Power Corporation, operated by W. S. Barstow & Co., 50 Pine Street, New York, has commenced the erection of a new generating plant at Holland, Pa., to cost more than \$300,000.

The Safety Sled Co., Mount Jewett, Pa., plans the erection of a new factory at Springville, N. Y., where a site has been acquired. It is said that the local works will be removed to the new location.

An addition will be erected to the trade and vocational school at Bethlehem, Pa., in connection with a school construction program to cost \$1,000,000. The Board of Education is in charge.

The Lackawanna Valley Fuel Co., Scranton, Pa., is planning to rebuild the portion of its coal washery destroyed by fire April 13, with loss reported at \$25,000 including machinery.

The Amerag Corporation, Allentown, Pa., manufacturer of motor-driven tractors and parts, has acquired property at Greenawalds, near Allentown, as a site for a new plant, including a power house. The company is operating with a capital of \$2,500,000. Aaron M. Greenawalds of Greenawalds is vice-president.

Baltimore

BALTIMORE, April 23.

PLANS are being perfected by the Northern Maryland Electric Co., Elkton, Md., for additions in its hydroelectric power plant near McCall's Ferry on the Susquehanna River, to develop a total of 410,000 hp. The work will cost approximately \$1,000,000, with machinery.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until May 15 for small hand tools for Eastern and Western yards, schedule 735; also for a quantity of miscellaneous files, schedule 734.

S. K. Wilson, Rebecca, Ga., is in the market for a boiler and 20-hp. engine and auxiliary power equipment.

The Baltimore & Ohio Railroad Co., Baltimore, has preliminary plans for enlargements in its local car and locomotive shops and the installation of additional machinery.

The Norfolk Sugar Refining Co., Norfolk, Va., recently organized with a capital of \$3,500,000, is perfecting plans for a new refinery on the waterfront, including a power house and machine shop, estimated to cost \$750,000. J. B. Morgan, R. B. Tucker and J. H. Caldwell, all of Norfolk, head the company.

The Barnesville Planing Mill, Barnesville, Ga., is in the market for a 300-ft. lumber conveyor and an 80-hp. boiler and appurtenances.

The Hackley-Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, is inquiring for a 100-kw. direct-connected generator, three-phase, 60 cycles, 600 volts; one 80-hp. horizontal boiler, to operate at 125 lb. steam pressure; one left-hand, heavy-duty Corliss engine, 26 x 60 in. or 30 x 60 in.; and one engine lathe, 18-in. swing.

The Water Department, Baltimore, is planning for the installation of two 8,000,000-gal. capacity centrifugal pumps at the waterworks plant in Druid Hill Park, to replace two 4,000,000-gal. units now in service. Bids will soon be asked. William A. Megraw is engineer.

The Common Council, Andrews, N. C., is arranging a bond issue of \$350,000 for a municipal hydroelectric power plant on the Hiwassee River, with capacity of 2500 hp. The Ludlow Engineers, Inc., Winston-Salem, N. C., is engineer.

J. B. McCracklin, Wiley, Ga., is in the market for an engine, boiler and auxiliary power equipment; also for a complete saw mill.

The Annapolis Public Utilities Co., Annapolis, Md., a subsidiary of the Washington, Baltimore & Annapolis Electric Railway Co., has acquired the municipal electric power plant at Laurel, Md., and will make extensions and install additional equipment.

The Elk Furniture Co., Lexington, N. C., has been acquired by new interests headed by J. T. Hedrick. Plans are in progress for the erection of a three-story machine department addition, 98 x 195 ft., to replace a portion of the factory recently destroyed by fire with loss approximating \$75,000. Other extensions will be made and additional machinery installed.

The Dawson Cotton Oil Co., Dawson, Ga., is in the market for a stationary engine, 250 hp., Corliss type.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for a steam shovel, about $\frac{3}{4}$ -yd. capacity, Erie or similar type.

The Beam Lumber Co., 2008 Broad Street, Camden, S. C., is arranging to rebuild its mill at Lugoff, S. C., recently destroyed by fire, with loss of about \$75,000, including machinery. D. A. Rudisill is general manager.

A manual training department will be installed in the proposed high school to be built at Rutherfordton, N. C., estimated to cost \$200,000, to be used jointly by the Boards of Education at Rutherfordton, Oakland, Ruth and Spindale. The first noted board is in charge.

The Blue Ridge Power Co., Tryon, N. C., is having plans prepared for a hydroelectric generating plant, to cost approximately \$700,000 with machinery. A steel tower transmission line will be built to cost \$125,000. Mees & Mees, Charlotte, N. C., are engineers.

The Baltimore Ice Mfg. Co., Aisquith Street, Baltimore, will build a new two-story plant at 409-11 Aisquith Street.

J. T. Williams, Athens, Ga., R. F. D. No. 1, is making inquiries for a 25-hp. engine and boiler.

A 1500-hp. electric power plant will be erected by the Lydia Cotton Mills, Inc., Clinton, Ga., in connection with a new plant to cost approximately \$155,000. Lockwood, Greene & Co., Charlotte, N. C., are engineers.

The Barnwell Veneer Co., High Point, N. C., Samuel B. Coffin, president, has acquired a site at Barnwell, N. C., for

a new mill, estimated to cost \$60,000 with power house and mechanical departments.

The Harry Brown Co., Gastonia, N. C., machinery dealer, is inquiring for a portable conveyor and unloader, to operate by gravity and by power.

A power plant will be constructed by the Rhodes Cotton Mills, Waco, N. C., in connection with an addition to cost \$200,000.

E. H. Robertson, Guyton, Ga., is in the market for a rotary pump and gasoline-operated stationary engine.

The Walkertown Chair Co., Walkertown, N. C., will build a one-story power house in connection with a new plant, 50 x 100 ft., and is in the market for boilers, engines and auxiliary equipment. W. N. Poindexter is president.

M. A. Carson, Kimesville, N. C., operating a wood-working plant, has inquiries out for a drill press, band saw and other equipment.

The Savannah Sugar Refining Co., Savannah, Ga., is planning to rebuild the portion of its branch works at Port Wentworth, Ga., recently destroyed by fire with loss estimated at \$50,000.

G. L. Newton, Machen, Ga., is in the market for a chain hoist, with capacity of about 10,000 lb.

W. B. Mays, Holton, Ga., is inquiring for a deep-well pump and pump jack, also for a screw plate for cutting threads.

Pittsburgh

PITTSBURGH, April 23.

APRIL now promises to equal March in machine tool orders in this district, although not much distinctly new business has developed so far. The first three months of the year saw an excess of inquiries over sales and recent sales have been almost entirely against these old inquiries. Orders booked for the most part have been for single tools, but two sales the past week involved a number of machines. One was for five precision lathes, three high-speed drills, two bench millers and three foot presses, while another order included a 14-in. x 10-ft. lathe, a shaper, two drill presses and a grinder, and were for a machine shop of a local power plant. The two lists were entirely on small tools and were sold out of stock. The Westinghouse Electric & Mfg. Co. is not yet buying very actively against its quarterly list, but is expected to start soon. The National Tube Co. is buying steadily against its list for its new Gary tube mill. In the heavier lines of equipment prospective business is better than present demand.

The Metal & Thermit Corporation, New York, which is building a new sheet mill on the Pacific Coast, has placed contract for the buildings with the Union Construction Co., Oakland, Cal., and an order for a 1500-hp. motor with the General Electric Co., but still is to close for the mill motors and other equipment.

A manual training department will be installed in the new two-story and basement high school to be erected at Ferndale, Pa., estimated to cost \$160,000. J. E. Adams, Nema Building, Johnstown, Pa., is architect.

The Moller Motor Co., Lewistown, Pa., manufacturer of automobile bodies, has acquired property at Hagerstown, Md., and has plans for new works to cost in excess of \$50,000. It is purposed to remove the present plant to the new site.

C. G. Hussey & Co., 2850 Second Avenue, Pittsburgh, manufacturers of brass and bronze products, have plans for a three-story and basement addition, 80 x 200 ft., estimated to cost \$230,000 with machinery.

The Pittsburgh Spring & Steel Co., McCandless Street, Pittsburgh, has awarded contract to the Austin Co., Union Arcade, for a one-story addition, estimated to cost \$17,000, exclusive of machinery.

The Reddog Products Corporation, Bessemer Building, Pittsburgh, manufacturer of hollow tile and other fireproofing materials, has acquired about 12 acres near Larimer Avenue and the Brilliant Cut-off of the Pennsylvania Railroad, and will have plans drawn for a plant to cost more than \$75,000, with machinery.

The Gardner Calculating Machine Co., High Street, Ebensburg, Pa., will take bids at once for a new two-story and basement factory, 90 x 100 ft., for the manufacture of calculating machines and parts, to cost approximately \$70,000, with equipment.

The Faith Pocahontas Coal Co., Beckley, W. Va., C. H. Meade, head, plans the installation of electric power and mechanical equipment at its properties near Charleston, W. Va.

The United States Corrugated Fiber Box Co., Warwood, W. Va., has plans for a two-story structure, 80 x 400 ft., with one-story building adjoining, 80 x 160 ft., to replace its plant recently destroyed by fire. Machinery will be installed to more than double the previous output. The works will cost \$100,000. Headquarters are at Indianapolis.

Fire, April 14, destroyed the power plant at the works of the Hutchison Coal Co., Mason City, W. Va., with loss approximating \$40,000. It will be rebuilt.

The Lewis County Cut Glass Co., Weston, W. Va., has plans for a two-story addition, 50 x 100 ft., to cost \$20,000, exclusive of machinery and transmission equipment.

The MacEachen Co., Fairmont, W. Va., recently organized with a capital of \$3,000,000 to manufacture coal-mining machinery, contemplates the erection of a plant, estimated to cost \$75,000. Other works will also be established in this district. E. H. Grau, Fairmont, heads the company.

The A. C. Love Co., Huntington, W. Va., is in the market for a hydraulic wheel press, about 200 tons capacity, for standard gage equipment; also for one 50-hp. engine, oil-operated.

The Weirton Steel Co., Weirton, W. Va., is planning to rebuild its box factory recently destroyed by fire with loss of \$25,000, including equipment.

Buffalo

BUFFALO, April 23.

LOCAL manufacturers of machinery are busy, although the tendency in the last few weeks has been toward the lighter and smaller types of equipment. This, however, has been sufficient to make up for the loss in demand for heavy machines.

The greatest activity is for small trade pumps, centrifugal and air compressors running from \$300 to \$1,000 each, small forges, drills, presses, punches and shears ranging in price from \$10 up to \$300, and for other types of hand tools. One manufacturer of pumping machinery for breweries, water circulating systems for boats and bakery machinery reports that business has fallen off considerably in the past six weeks.

The Buffalo Bronze Die Cast Corporation reports an increased demand from the automobile industry. It plans to build a steel and concrete addition to add 25 per cent to its capacity.

The Snow works of the Worthington Pump & Machinery Corporation, Buffalo, is building a vertical triple expansion pumping engine, capacity 20,000,000 gal., for the St. Louis waterworks and another of the same type, 8,000,000 gal. capacity, for the Western Hills pumping station, Cincinnati. Two horizontal cross compound fly-wheel pumping engines of 15,000,000 gal. capacity each are being constructed for Memphis, Tenn., and a Diesel engine, vertical type, 1125 hp., for the Fredonia Portland Cement Co.

Bids are being received by the city of Buffalo for reinforced concrete covering for the Scajaquada Creek to cost approximately \$3,000,000. It is anticipated that this project will develop a demand for from \$40,000 to \$50,000 worth of air equipment, including a 1500-ft. compressor.

Considerable air equipment, mixers, forms, steel towers, etc., will be needed for Rochester's \$2,000,000 subway project, contract for which will be let shortly.

The Board of Education, 1401 Telephone Building, Buffalo, will receive bids until May 2 for transformers, switches and other electrical equipment for the Elmwood Avenue Vocational School. D. J. Sweeney is deputy superintendent.

The American Radiator Co., Elmwood Avenue, Buffalo, will erect a one-story addition, 32 x 82 ft., to be equipped as a coal-grinding plant, to cost \$20,000.

Frank Sweet, 540 Glenwood Avenue, Buffalo, operating a structural steel plant, has organized the Frank Sweet Structural Steel Co., with capital of \$50,000, to take over and expand the business.

The Buerk Tool Works, 38 Pearl Street, Buffalo, is inquiring for a Rivett internal grinder.

The Federal Auto Truck Agency, 504 East Willow Street, Syracuse, N. Y., operated by John Barzee, has plans for a two-story and basement service and repair works on West Genesee Street to cost \$75,000. Gustavus A. Young, McCarthy Building, is architect.

The Northern New York Utilities, Inc., 53 Public Square, Watertown, N. Y., is completing plans for a two-story machine shop and service works for company trucks and cars, to cost \$45,000.

Klock Brothers, Main Street, Philadelphia, N. Y., operating a machine shop, plan the installation of an air compressor, pattern-maker's saw and other equipment.

The Board of Education, Buffalo, plans the erection of a trade and vocational school at Lackawanna, in connection with other school buildings, estimated to cost \$500,000.

A manual training department will be installed in the new junior high school to be erected at Rome, N. Y., estimated to cost \$350,000, for which the Board of Education will soon select an architect.

The Otis Steam Boiler Co., 335 West First Street, Oswego, N. Y., plans the construction of new one-story works, estimated to cost \$45,000 with equipment. J. F. Otis is in charge.

The Black River Traction Co., West Main Street, Watertown, N. Y., is inquiring for a 20-in. vertical drill.

G. F. Forrester, Court Street, Watertown, N. Y., operating a forge shop, plans the installation of a 400-lb. drop hammer.

A manual training department will be installed in the proposed high school to be erected at Carthage, N. Y., for which bonds for \$185,000 have been approved. D. D. Kieff, Flower Building, Watertown, N. Y., is architect.

The Rochester Gas & Electric Co., Rochester, N. Y., is planning for extensions in its main steam-operated generating plant and the installation of a 15,000-kw. turbo-generator and auxiliary equipment. A fund of about \$3,000,000 has been arranged for this and other expansion during the year.

A manual training department will be installed in the new three-story high and grade school, 85 x 125 ft., to be erected at Mayville, N. Y., estimated to cost \$165,000, for which bids will be received on a general contract until May 2. Beck & Tinkham, 317 Washington Street, Jamestown, N. Y., are architects.

The Western New York Utilities Co., Inc., Medina, N. Y., will install a new generator and other machinery at its power plant at Waterport. G. W. Ide is general manager.

The Stevens Brothers Co., Main Street, Henderson, N. Y., operating a machine and gasoline engine repair works, has inquiries out for a motor-driven slotter and metal saw.

G. H. Balts, 215 Coffeen Street, Watertown, N. Y., operating a machine works, plans the installation of a metal saw, boring mill and other equipment.

The Department of Water and Lighting, Jamestown, N. Y., is considering the installation of additional equipment in the municipal power plant, including water-tube boilers, stokers and other apparatus.

Chicago

CHICAGO, April 23.

BUYING is still less active than in March, although a fair volume of business is coming in, consisting principally of orders for single machines. At the present writing it would appear that sales totals for April will fall short of the March record. However, in view of widespread industrial activity and sustained interest in the market as evidenced by the number of inquiries appearing, sellers look for good business in May. Orders from the railroads also promise to be liberal. The Santa Fe has put out inquiries for 64 machines, and these are said to be only part of a list of fully 100 items which will be in the hands of the trade within the next week or two. This road is also contemplating the erection of a large shop at San Bernardino, Cal., which will involve a large expenditure for machine tool equipment.

Purchases by the automobile industry consist mainly of single machines bought from time to time to complete existing production facilities. A manufacturer of automotive parts has placed an order for three automatic cylinder grinders, involving a total expenditure of about \$13,000. The Chicago, Burlington & Quincy is in the market for jib cranes, trolleys, hoists, etc., for its Denver shop, which will involve an expenditure from \$40,000 to \$50,000.

The Santa Fe List

One 12 x 36-in. belt-driven universal tool grinding machine.

One Jarecki No. 6 belt-driven pipe and nipple threading machine complete with right hand dies for threading standard pipe from 1 to 6-in.; inclusive with cutting off and reaming attachment.

One 32-in. single head light duty belt-driven pillar shaper.

Two 36-in. x 16-ft. heavy duty type geared head belt-driven engine lathes.

One Yankee drill grinder, or equivalent, capacity $\frac{1}{4}$ to $1\frac{1}{2}$ in.

One 14-in. x 6-ft. heavy duty belt-driven engine lathe with step cone drive.

One 16-in. x 8-ft. Hendey, or equivalent, belt-driven heavy duty type engine lathe for tool room work.

One motor-driven Putnam, or equivalent, standard pattern 90-in. driving wheel lathe.

Two motor-driven special vertical boring and facing mills for driving box work.

Two 20 x $2\frac{1}{2}$ -in. wheel wet grinders.

Four 16-in. x 6-ft. portable lathes.

One 48-in. car wheel borer.

One 24-in. x 16-ft. engine lathe, Boye & Emmes, or equivalent.

One 20-in. drill press.

One 42-in. squaring shear.

One Niles, or equivalent, 100-in. vertical boring mill.

One 24-in. x 14-ft. heavy duty type motor-driven engine lathe, Boye & Emmes or equivalent.

One 250-ton hydraulic press.

One belt-driven double-end punch and shear, 24-in. throat, capacity $1\frac{1}{4}$ -in. hole through 1-in. plate.

One motor-driven horizontal boring and drilling machine similar to Lucas No. 4F.

One 1600-lb. single frame steam hammer.

Two 4000-lb. double frame steam hammers.

One 600-lb. single frame steam hammer.

One 51-in. heavy duty type belt-driven vertical boring mill, Putnam or equivalent.

One 51-in. heavy duty type belt-driven vertical boring and turning mill, Putnam or equivalent.

Two 54-in. heavy duty belt-driven vertical boring mills, Putnam or equivalent.

One 6-ft. belt-driven radial drill.

Three 24-in. belt-driven upright sensitive drills.

One belt-driven Brown & Sharpe, or equivalent, universal tool grinder, 12 x 36 in.

Two motor-driven single wet emery grinders, 20 x $2\frac{1}{2}$ -in. wheel, push button control.

One belt-driven American No. 2, or equivalent, cabinet brass turret lathe, $18\frac{1}{2}$ in. x 6 ft.

One belt-driven $1\frac{1}{4}$ x 24-in. turret screw machine.

Two 16-in. x 5-ft. belt-driven heavy duty type engine lathes, Boye & Emmes or equivalent.

Two 18-in. x 10-ft. belt-driven heavy duty type engine lathes, Boye & Emmes or equivalent.

One 22-in. x 10 ft. heavy duty type belt-driven engine lathe, Boye & Emmes or equivalent.

One 24-in. x 10-ft. heavy duty type belt-driven engine lathe, Boye & Emmes or equivalent.

Two 24-in. x 12-ft. belt-driven heavy duty type engine lathes, Boye & Emmes or equivalent.

One 24-in. x 16-ft. motor-driven heavy duty type engine lathe, Boye & Emmes or equivalent.

One Lodge & Shipley or equivalent 36-in. x 14-ft. heavy duty type motor-driven engine lathe.

One $2\frac{1}{2}$ x 24-in. hollow-spindle belt-driven turret lathe.

One 24-in. x 24-in. x 24-in. belt-driven crank planer.

One 36-in. x 36-in. x 12-ft. belt-driven heavy duty type planer.

Three Oster No. 304-A belt-driven pipe and nipple threading machines with right hand dies for threading standard pipe from 1 to 4 in., inclusive.

One motor-driven double end punch and shear, 18-in. throat, capacity 3-in. hole in $1\frac{1}{2}$ -in. plate.

One 6-ft. hand-screw operated flanging clamp.

One belt-driven Dreis & Krump, or equivalent, cornice brake, 6 ft. between housings, to handle No. 16 gage iron.

One 5-ft. hand power squaring shear, Pexto or equivalent, for shearing No. 18 gage iron.

One Watson-Stillman or equivalent pump portable 250-ton crank pin press with reversing cylinder.

The Cook Electric Co., Zion City, Ill., will move its plant to Chicago, having purchased from the A. Nelson Mfg. Co. a one-story factory, comprising 40,000 sq. ft. of floor space at 2700 Southport Avenue. The company is also having plans prepared for a 5000-sq. ft. addition on the west end of the Southport Avenue property. The A. Nelson Mfg. Co. has leased manufacturing space elsewhere.

Frank D. Chase, Inc., engineer, Chicago, has been retained by the Central Manufacturing District, Inc., Los Angeles, Cal., to take charge of the construction of a warehouse and manufacturing terminal to cost \$5,000,000. This development will be similar to the Central Manufacturing District of Chicago and is financed primarily by Chicago, New York and Boston business men, among them J. A. Spoor, A. G. Leonard and H. E. Poronto of Chicago.

The Mulvey Iron Works, 1840 Carroll Avenue, Chicago, will start work within 60 days on the first unit of a new structural steel plant, to cost \$85,000, on the Chicago & North Western Railroad, just north of Fulton Street and west of California Avenue. It will contain 20,000 sq. ft., and next year a second unit will be erected.

David S. Klaffer, architect, 64 West Randolph Street, Chicago, is receiving bids on a two-story garage, 100 x 200 ft., 4117-25 Broadway, for the Commodore Garage Co., to cost \$150,000.

The Ward Mfg. Co., 3047 Sheffield Avenue, Chicago, recently incorporated with \$5000 capital stock, manufactures a line of toys and novelties and electric curling irons and grills. It is not in the market for metal-working tools at present. Officers are: President, R. J. Rich; vice-president and general manager, W. E. Guest, and secretary, J. T. Evans.

The Davenport Perfect Sash Weight Foundry Co., Davenport, Iowa, recently incorporated with \$200,000 capital stock, plans to manufacture a sash weight invented by B. F. Aufderhide, president of the company. H. Burmann is vice-president.

Earl M. and Lloyd H. Neuman have purchased the business of the Rapid Heater Co., Grand Rapids, Mich., and are operating it in connection with the Neuman Heating Co. of that city. The old name will be used and the manufacture of Rapid Heater instantaneous heaters and tank gas water heaters will be continued.

The Miehle Printing Press & Mfg. Co., Fourteenth and Robey Streets, Chicago, has let contract for a two-story factory, 80 x 150 ft., at 2131 Hastings Street, to cost \$100,000.

The Reo Motor Car Co., 2412 South Michigan Avenue, Chicago, has let contract for a two-story salesroom and shop, 85 x 125 ft., 5710-16 Broadway, to cost \$100,000.

The Stewart Mfg. Corporation, 4535 Fullerton Avenue, Chicago, manufacturer of die castings, has let contract for a one-story factory, 73 x 184 ft., to cost \$50,000.

The Yellow Cab Mfg. Co., 5801 Dickens Avenue, Chicago, has let contract for a one-story factory, 202 x 512 ft., 6601 Dickens Avenue, to cost \$500,000.

The Central Auto Body Co., 3942 West Lake Street, Chicago, has let contract for a one-story factory, 75 x 120 ft., at the same address, to cost \$25,000.

The Frank Foundries Corporation, Twenty-first Street and Second Avenue, Moline, Ill., will erect an addition containing 14,000 sq. ft. of floor space to cost \$20,000. The building will include core room containing 2000 sq. ft., an addition to the foundry of 3000 sq. ft., the erection of a retaining wall for the storage of raw materials, a new carperter shop, fire-proof pattern vault and covered casting and sand storage house, involving a total of 9000 sq. ft. The capacity of the plant will be increased from 20 to 25 per cent.

The Coldwater Machine & Elevator Co., Coldwater, Mich., will soon start the erection of an addition, containing 3000 ft. of floor space.

The Hulst-Starlin Lead Co. will occupy the former factory of the American Conduit Co., on Railroad Avenue, East Chicago, Ind., and expects to be in operation May 15, manufacturing corroding and antimonial lead, type metals and babbitt metals. L. P. Starlin is president of the new company, and the other officers are E. Covert Hulst, vice-president; George P. Hulst, secretary, and T. M. Egan, treasurer. Approximately 25 men will be employed.

Detroit

DETROIT, April 23.

THE Palmer-Bee Co., East Grand Boulevard and Cameron Avenue, Detroit, manufacturer of power transmission and conveying machinery, has plans for a one-story addition, 120 x 200 ft. Smith, Hinchman & Grylls, 800 Marquette Building, are architects and engineers.

The Hayes Wheel Co., Jackson, Mich., is considering the erection of a branch plant at Oakland, Cal., where a site is now being selected. C. D. Hayes is president.

The Michigan Porcelain Tile Works, Inc., Ionia, Mich., has authorized plans for enlargements and the installation of new machinery. The company has increased its capital from \$100,000 to \$150,000 to provide for the expansion. R. A. Hawley is president.

The Detroit Lubricator Co., Lincoln Avenue, Detroit, manufacturer of lubricating devices, has plans for an addition, to be four or six stories, estimated to cost \$100,000. Smith, Hinchman & Grylls, Marquette Building, are architects and engineers.

The Monarch Mfg. Co., 620 St. Antoine Street, Detroit, manufacturer of hardware products, has awarded contract to Joseph A. McGrath, Goebel Building, for a two-story plant on Hart Street, estimated to cost \$25,000 exclusive of machinery.

A manual training department will be installed in the new three-story and basement high school to be erected at Trenton, Mich., 155 x 190 ft., estimated to cost \$165,000, for which foundations will soon be laid. R. A. LeRoy, Pratt Building, Kalamazoo, Mich., is architect.

The Challenge Machinery Co., Grand Haven, Mich., manufacturer of printing presses and parts, has commenced further enlargements at its plant. An extension was made recently to the foundry.

The Pittmans & Dean Co., Farwell Building, Detroit, will build a two-story ice-manufacturing plant on Broad Street estimated to cost \$50,000.

The Ryan-Bohn Foundry, Inc., Lansing, Mich., will install additional equipment to increase the capacity from 125 to 200 tons per day.

Construction work was started April 2 on the new Fisher Body plant at Pontiac, Mich. The Utley Construction Co., Detroit, has the general contract, which calls for completion of the plant in 90 days.

Newman Erb, president Ann Arbor Railroad Co., states that the company will begin work soon on new shops at Owosso, Mich. The program includes a roundhouse and machine shop to cost several hundred thousand dollars. The buildings will be erected on a 17-acre tract east of the city.

The Brunswick-Balke-Collender Co., Muskegon, Mich., which is rebuilding the part of its works recently destroyed by fire, has completed plans for another addition, to cost \$70,000, and will start construction in the near future.

Cincinnati

CINCINNATI, April 23.

WHILE April will hardly come up to March in the volume of business booked by local machine-tool manufacturers, the aggregate is satisfactory. There has been no let-up in inquiries, which are mostly for one and two machines, but there seems to be a little more hesitancy on the part of prospective buyers in closing orders. More railroad buying is expected to develop and some export business, particularly to South America, is a probability, according to manufacturers who have been asked to quote on a number of machines. Buying by the automotive industry is holding up, particularly for milling machines.

A local manufacturer of planers booked an order for a large machine the past week for shipment to Cuba, and another manufacturer of tools, who usually does a large business in the Far East, is reported to have booked orders from India, China and Japan.

The shortage of good mechanics has become acute, and even with payment of peak wages, shops are unable to get a sufficient number of men to take care of orders, and in many plants overtime work is being resorted to in order to keep production equal with delivery promises.

The Hanna Locomotive Stoker Co., Cincinnati, has purchased property at the intersection of Brotherton Road and Erie Avenue, and has awarded contract to the Austin Co., Cleveland, for a plant to cost approximately \$50,000. It is expected that it will be ready for occupancy June 10.

The factory of the Hill & Griffith Co., State Avenue, Cincinnati, manufacturer of foundry facings, was completely destroyed by fire, April 16, with loss of \$150,000. Operations will not be interfered with, however, as the company has another plant on Evans Street in which manufacturing operations were resumed the day following the fire.

The Wiesman Mfg. Co., Dayton, Ohio, manufacturer of press guards, has moved its plant from 18 North Canal Street to the Beaver Power Building, 19 South St. Clair Street, where it has taken larger quarters and installed additional equipment to take care of its rapidly expanding business.

A power house will be erected at the Indiana State

Normal School, Muncie, Ind., and bids are now being taken for its erection, together with the construction of a steam pipe tunnel, chimney, and furnishing two boilers with stoking equipment. Helen C. Benbridge is secretary of the board at Muncie.

The Ewald Spring Co., Louisville, manufacturer of springs, has let contract for a reinforced concrete factory at 312 South Clay Street.

Milwaukee

MILWAUKEE, April 23.

MANUFACTURERS of machine tools continue to make gains in bookings despite the fact that in the past 10 days the demand has been somewhat irregular, with some buying interests of recent months, particularly the automotive industries, apparently having covered needs for the present. There is no belief that higher prices have checked trade, for buying has been predicated upon needs. It is believed, however, that recent expansion in the general metal industries has come to the point where a temporary halt is necessary to determine the wisdom of providing more capacity lest there occur a runover. Structural fabricators have encountered a lull in demand, especially from industrial sources. The exhaustion of the labor supply is believed by some to be a dominating factor in the situation and threatens to become predominant.

The Milwaukee Sewerage Commission, 508 Market Street, on April 20 rejected all bids opened April 13 for furnishing two 20-ton electric and three 10-ton electric or hand-operated cranes for the power plant of the Jones Island sewage disposal system, and will seek new tenders shortly. The Milwaukee Electric Crane & Mfg. Co. was lowest bidder on the electric traveling cranes.

The Phoenix Light Co., 525-527 Market Street, Milwaukee, manufacturer of standard and ornamental metal illuminating fixtures, has leased 20,000 sq. ft. of additional floor space at 529-531 Market Street and is purchasing some miscellaneous production equipment. Joseph Sable is president and general manager.

Winstanley Brothers, Oshkosh, Wis., machinists, will build a new shop, 32 x 60 ft., on Sixth Street and are inquiring for a small list of miscellaneous tools for immediate delivery.

The Delta Mfg. Co., 911 Fifth Street, Milwaukee, established recently to manufacture automotive equipment and accessories, is enlarging its shop and buying several additional tools, including a drill press and lathe.

The Teela Sheet Metal Co., Oshkosh, Wis., a new corporation succeeding the Teela Sheet Metal Works, will let contracts this week for a two-story addition, 30 x 50 ft., and is inquiring for additional equipment.

The Northern Wisconsin Hydro-Electric Power Co., Port Wing, Wis., has contracted with the Jacobson Engineering Co., 533 Metropolitan Bank Building, Minneapolis, for the construction of a dam and power house estimated to cost \$50,000, including initial equipment. R. Okerstrom is president and chief engineer.

The S. K. Williams Co., Milwaukee, has been incorporated with a capital stock of \$30,000 to manufacture metal products. It takes over the partnership business of S. K. Williams & Co., for several years conducting a machine and electro-plating shop at 848-850 Thirty-second Street, which will be enlarged and additional equipment installed. Stanley K. Williams is president and general manager. Robert Steuernagel, formerly with the Briggs & Stratton Co., Milwaukee, has been engaged as works manager.

The Board of Education, Oshkosh, Wis., is taking bids until May 2 for the equipment of the Roosevelt Vocational school, including light wood-working and metal-working tools, student and instructor tool sets, etc.

The Frost Mfg. Co., Kenosha, Wis., brass founder and manufacturer of plumbers' goods, automotive brass goods, etc., is starting construction on a one-story brick and steel casting shop addition, 60 x 90 ft., and will install a battery of electric brass melting furnaces. The total investment will be \$40,000. Walter J. Frost is president and general manager.

The Air Supply Station Co., Oakfield, Wis., has been incorporated with \$20,000 capital to manufacture compressors, tanks and other units and parts for systems for garages and oil stations. A factory will be leased and equipment installed. The principals are Frank E. Willard and Arno A. Ewald.

The Village Board of Milton, Wis., is taking bids for

the construction and equipment of a new municipal water-works and sewerage system, including two 300-gal. centrifugal pumps, engine driven; one 40,000-gal. steel tank on 80-ft. steel tower; 22,380 lin. ft. of water pipe; 35 hydrants and 20 valves, and a complete sewage disposal installation. W. G. Kirchhoffer, Madison, Wis., is consulting engineer in charge.

The American Candy Pulling Machine Co., Milwaukee, has been organized with \$100,000 authorized capital stock to manufacture special machinery for the confectionery industry. The principals are represented by Blair MacQueen, Jerome A. Bond and Gerald P. Hayes, attorney, 425 East Water Street. It is the intention to equip a machine shop, but no other information has been given out.

The Field Motor Co., Rice Lake, Wis., has been incorporated with an initial capital of \$50,000 by T. H. Field, Ray C. Peck and Thomas W. Quinn. Mr. Field has been doing experimental work for three years on a new design of passenger car chassis with a twin-three cylinder engine, which is now ready to put into regular production. The first unit of a factory will be erected at once and will consist of a machine shop and assembling floor, for which both new and used tools are being provided. T. H. Field is president and chief engineer.

Endres Brothers, Springfield Corners, Wis., have purchased buildings in Waunakee, Wis., and will buy a small list of equipment for the production of metal specialties, principally a magazine for rifles and an auxiliary oiling device for Ford cars. The firm has been conducting operations on a small scale in connection with a garage and service business.

The American Tool & Production Co., Milwaukee, has been incorporated with a capital stock of \$50,000 to manufacture tools, dies, jigs, etc., and metal specialties. The identity of the principals is not revealed pending the completion of the plant. Edmund C. Rosenberg, attorney, 606 Caswell Block, is handling details.

Dan Kosich, South Byron, Wis., is organizing a \$50,000 corporation which will manufacture a line of horticultural tools and implements, principally a device for removing fruit from trees. The proposed factory probably will be established in Fond du Lac, Wis.

The Milwaukee Gas Light Co., 182 Wisconsin Street, Milwaukee, has announced plans for the installation of a liquid purification plant costing \$100,000 at the Third Ward producer plant, foot of Milwaukee Street. This is part of new work aggregating \$750,000 in cost which is projected for 1923. R. B. Brown is president and general manager.

Indiana

INDIANAPOLIS, April 23.

PLANS are being arranged by the Lavelle Foundry Co., Michigan Street and the Belt Railway, for the electrification of its plant, including the installation of considerable new equipment.

The Majestic Foundry & Furnace Co., Market Street, Huntington, Ind., is considering the erection of a one-story addition to cost about \$17,000, exclusive of equipment.

The Indiana Automatic Sprinkler Co., 324 West Tenth Street, Indianapolis, has leased the two-story building at Market and Noble Streets and will remove to this location. The output will be increased. R. H. Burdick is president.

The Machinery Clearing House, Indianapolis, has inquiries out for three 150-hp. boilers, 125 to 150 lb. pressure; two 100-hp. boilers, 100 lb. pressure; and two or three water-tube boilers, Stirling type, for a battery of 1000 hp.; also for one 37½ kva., single phase transformer.

The Marion Machine, Foundry & Supply Co., Marion, Ind., is inquiring for a power rotary shear.

The Westinghouse Electric & Mfg. Co., Indianapolis, has leased the three-story concrete building now being erected at 814-20 North Senate Avenue, totaling 50,000 sq. ft., for local headquarters. A complete operating department, with machine and repair shop, will be installed. It is proposed to increase the height of the structure to five stories.

The Interstate Public Service Co., Indianapolis, has acquired the plant of the Jeffersonville Water, Light & Power Co., Jeffersonville, Ind., for \$250,000. Plans are under way for extensions, including the installation of additional equipment.

A manual training department will be installed in the new three-story central high school, 80 x 120 ft., to be erected at Mishawaka, Ind., estimated to cost \$700,000. Perkins, Fellows & Hamilton, 914 Tower Court Building, Chicago, are architects.

The Board of Trustees, Eastern Indiana Hospital for the Insane, Richmond, Ind., will build a new power house estimated to cost \$70,000.

The Rushville Water & Light Co., Rushville, Ind., has

plans for an addition to its power house. Improvements will also be made in the present station, including machinery installation. McGuire & Shook, Pythian Building, Indianapolis, are architects.

C. A. Wulf and Frank Shellhouse, Indianapolis, have purchased the plant of the American Tank & Valve Co., Mars Hill section, and will remodel it for the manufacture of brass and bronze products. It is purposed to organize a company.

A manual training department will be installed in the new junior high school to be erected at Marion, Ind., estimated to cost \$275,000, for which W. C. Findt, architect, Springfield, Ohio, has been selected to prepare plans.

The Fleischmann Co., 701 Washington Street, New York, will install a cold storage and refrigerating plant in the building at Ohio and Fulton Streets, Indianapolis, recently leased for a new factory branch. It will be electrically operated.

The Gulf States

BIRMINGHAM, April 23.

PLANS are being prepared by the Red River Refining Co., Shreveport, La., for a new oil refinery, with by-product departments, estimated to cost \$500,000 with machinery. A power house will also be built. The company recently increased its capital from \$1,000,000 to \$2,000,000 for expansion.

The Buell Lumber & Mfg. Co., Dallas, Tex., has plans for a number of additions to cost in excess of \$100,000, with machinery. The company has increased its capital from \$75,000 to \$500,000 for expansion.

The United States Cast Iron Pipe & Foundry Co., Birmingham, has plans for a one-story machine shop at its North Birmingham works, estimated to cost \$40,000.

The New Orleans Sheet Metal Works, Inc., 1106 North Rampart Street, New Orleans, will install a swedging machine, pipe crippling machine, edger and other machinery.

H. W. Dexter, P. O. Box 665, Jacksonville, Fla., machinery dealer, has inquiries out for a 1000-gal. pump, with auxiliary operating equipment.

The Southern Paper Co., Kreola, Miss., will commence the erection of additions to its mill at Moss Point to more than double the present capacity. The work will cost \$1,500,000, including power plant and machine shop.

The Diamond Steel Highway Sign Co., Waco, Tex., has purchased property at First Avenue and the Santa Fe Railroad, Dallas, for the establishment of a new plant. The present building will be remodeled and extended and the Waco works removed to this place. Additional machinery will be installed. E. A. Decker, Southwestern Life Building, Dallas, is vice-president in charge.

A manual training department will be installed in the new school to be erected at Lanett, Ala., estimated to cost \$100,000, for which ground will be broken at once. The Board of Education is in charge.

Ovens, power equipment, conveying and other machinery will be installed in the seven-story addition to be erected at the plant of the Brown Cracker & Candy Co., Jefferson and McKinney Streets, Dallas, Tex., estimated to cost \$1,000,000. J. L. Brown is president.

The Orlando Mfg. Co., P. O. Box 1256, Orlando, Fla., manufacturer of piston rings, connecting rods and other automobile equipment, has acquired a local building, 50 x 120 ft., for a new plant, and will install the machinery at an early date. E. J. Jenkins is president and general manager.

The Gulf Production Co., Hull, Tex., will commence the construction of a new electric generating plant to cost about \$1,000,000, including machinery and transmission lines.

The Halifax Rock Co., Daytona, Fla., recently organized with a capital of \$100,000, is planning the installation of equipment at its local properties, including rock crushers, locomotive, dump cars, motors and other power equipment. J. D. C. Morris is president.

A manual training department will be installed in the new high school to be erected at Pilot Point, Tex., estimated to cost \$65,000, for which plans will soon be prepared.

The San Antonio, Medina Lake & Western Railroad Co., San Antonio, Tex., recently organized, is planning the erection of car and locomotive repair shops in connection with its new line from San Antonio to San Angelo, 190 miles. The company is headed by P. G. Lucas and W. L. Williams, both of San Antonio.

The Common Council, Huntsville, Ala., is planning for the installation of electrically-operated pumping machinery in connection with extensions and improvements at the municipal waterworks.

The Alabama Power Co., Birmingham, plans the construction of a new hydroelectric generating plant on the Warrior River, estimated to cost close to \$1,000,000, with machinery and transmission lines.

The Common Council, Edgewood, Tex., has approved plans for the installation of a municipal electric lighting plant. Bids will be asked at an early date.

A manual training department will be installed in the new high school to be erected at Ballinger, Tex., for which a bond issue of \$150,000 is being arranged. The Board of Education is in charge.

The Rochester Gasoline Co., Rochester, Tex., will build a new gasoline refinery at Ivan, Tex., with initial output of 4000 gal. per day, estimated to cost about \$50,000. E. L. Huntsman is president.

The Southern Power & Mfg. Co., New Orleans, has acquired the municipal electric plant at Poplarville, Miss. Extensions and improvements will be made and additional machinery installed. An ice-manufacturing and refrigerating plant is also contemplated. E. H. Baringer, Covington, La., is general manager.

A manual training department will be installed in the new high school to be erected at Murchison, Tex., estimated to cost \$65,000, for which plans will soon be drawn. The Board of Education is in charge.

The Tampa Glass & Bottle Mfg. Co., Tampa, Fla., recently reorganized with a capital of \$100,000, is planning the erection of a new works at Gary, Fla., to cost approximately \$50,000. A power house is also projected. Perry G. Wall is president.

Frank Bruce, Parrish, Ala., is organizing a company to build an ice-manufacturing and refrigerating plant, to cost \$60,000.

The Central South

St. Louis, April 23.

ERECTION will commence on a new one and one-half story car shop addition at the repair works of the United Railways Co., 3869 Park Avenue, St. Louis, estimated to cost \$55,000.

The D. & C. Storage Battery Co., 1008 West Douglas Avenue, Wichita, Kan., manufacturer of electric batteries, plans the installation of a drill press. C. G. Dickerson is head.

The Common Council, Brookfield, Mo., has called a special election April 30 to vote bonds for \$95,000 for the construction of a municipal electric light and power plant.

A manual training department will be installed in the three-story and basement high school to be erected at Portageville, Mo., estimated to cost \$70,000. The Lindsay Architectural Co., Sikeston, Mo., is architect.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., has inquiries out for a 14-in. engine lathe, with taper attachment; a 100-hp. motor, three phase, 60 cycle, 220 volts; 100-hp. boiler, Scotch marine type, 100 lb. pressure; 80 to 100-hp. engine and auxiliary power equipment.

The Kentucky Utilities Co., Lexington, Ky., has tentative plans for an electric generating plant near Pineville, Ky., estimated to cost \$1,000,000 with machinery. L. B. Herrington is vice-president and general manager.

A manual training department will be installed in the new high school to be erected at Junction City, Ky., estimated to cost \$70,000. J. Harris, Nicholasville, Ky., is architect.

The Enid Terminal Elevator Association, Enid, Okla., will build a power house in connection with its proposed grain elevator and processing plant, estimated to cost \$500,000, for which plans will be prepared at once. A mechanical conveyor and drying system will be installed.

The Southern Signals Co., La Grange, Ky., is planning the construction of a new factory for the manufacture of railroad signals and devices, estimated to cost \$60,000.

The Pool Point Coal Corporation, Praise, Ky., is planning for the installation of motors, power machinery and other equipment at its coal properties. Bids will be called during May. R. V. Wohlford is president.

The Common Council, Lawrenceberg, Tenn., is planning for the construction of a municipal hydroelectric power plant on Shoal Creek, with initial capacity of 1000 hp. It will cost in excess of \$100,000, with equipment.

The Landau Cabinet Co., 1545 Tower Grove Avenue, St. Louis, is planning the erection of an addition to provide about 20,000 sq. ft. of additional floor area. It will cost about \$45,000 with equipment. Alexander Landau is president.

Bids will be received by the City Council, Independence, Kan., until May 3 for pumping machinery and electrical equipment for the sewerage disposal plant, consisting of one motor-driven, 1550 gal. per min. centrifugal pump; two motor-driven, 775 gal. per min. centrifugal pumps; panels, switches, etc. G. H. Kriehagen is city clerk, and Hugh W. Crawford, city engineer.

Bedsie & Girard, 1107 West Douglas Street, Wichita, Kan.,

are in the market for a power lathe, drill press and other equipment, including wood-working machinery.

A manual training department will be installed in the new two-story high school to be erected at Spiro, Okla., 112 x 115 ft., estimated to cost \$65,000. Haralson & Nelson, Merchants' Bank Building, Fort Smith, Ark., are architects.

Bonds have been voted for \$400,000 for the erection of a junior high school at Emporia, Kan., to include a vocational department. Plans will be completed and bids called at an early date. J. H. Felt & Co., 800 Grand Avenue Temple, Kansas City, Mo., are architects.

Claude H. Light, Garden Grove, Iowa, is organizing a company with a capital of \$500,000 to construct and operate a cement mill at St. Joseph, Mo., for the production of special sandless cement. The plant will include a power house and machine shop and is estimated to cost \$250,000.

A manual training department will be installed in the new high school to be erected at Wilson, Kan., estimated to cost \$75,000, for which Smith & English, architects, Nelson Building, Hutchinson, Kan., have been selected to prepare plans.

The George A. Mills Co., Huntington, W. Va., formerly known as the Huntington Refrigerator & Fixture Co., has acquired the plant of the Sanders Spoke Co., Normal, Ky., and will establish a new works. Additional buildings will be erected and machinery installed. The present plant may later be removed to the new location.

A manual training department will be installed in the new junior high school to be erected at Kansas City, Kan., estimated to cost \$250,000, for which bids will be received on a general contract until May 7. Rose & Peterson, Brotherhood Block, are architects.

Canada

Toronto, April 23.

WHILE the demand for machine tools has shown some weakness the past week, business booked is a decided improvement over that of a year ago. Labor saving and production increasing equipment is under consideration by many manufacturers and the call for this class of machinery is steadily increasing. While no large lists have been issued, a good demand exists for units of one or two, covering practically every line of manufacture and coming from widely scattered sources.

J. A. Whittaker, 723 Dorchester Street, Montreal, is in the market for a small band saw, woodworker and shaper, etc.

The Town Council, Yarmouth, N. S., will purchase a centrifugal pump for the waterworks plant.

The Toronto Hydro-Electric Commission, Yonge Street, Toronto, will spend \$90,000 on an addition to sub-station on Bay Street.

The Springer Lock Mfg. Co., Belleville, Ont., will build a one-story addition to its plant to be used as a plating department.

The Thompson Motor Supplies, Ltd., 415 Queen Street West, Toronto, has retained Smith & Wright, 2945 Dundas Street West, to prepare plans for a factory at Acton, Ont., at a cost of \$15,000.

The Wingham Wire Co., Hamilton, Ont., is building an addition to its plant and installing equipment for the manufacture of plow steel and wire steel for springs. Furnaces will be installed for tempering high carbon rods for spring and rope wire. It is stated that \$50,000 will be spent for the addition and new wire-drawing equipment.

Walker Brothers, Hoquiam, Wash., makers of boilers and engines, have acquired the plants of the Schaake Machine Works, the Shore Bolt Nut Co., and the Pacific Standard Motor Works of Vancouver, B. C., which will be consolidated and operated under the name of the Haynes Boiler & Engine Co. It is the intention of the new owners to spend \$200,000 on new equipment.

The Dominion Government will erect a floating dry dock at Vancouver, B. C., to cost \$2,500,000. It will be built in sections and will be 132 x 500 ft. Included in the project will be machine shops, the largest of which will be 60 x 250 ft., plate and blacksmith shops, power house, and other buildings.

The Powell River Power & Pulp Co., Powell River, B. C., will build a steam power plant to cost \$500,000.

The British Columbia Electric Co., Vancouver, B. C., will erect an automatic electric sub-station. A one-story reinforced concrete building will be built and equipment to cost \$39,000 will be installed by the Canadian Westinghouse Co.

The West Kootenay Power Co., Vancouver, B. C., will increase the capacity of its Bonnington Falls power plant from 30,000 to 60,000 hp.

The Wilkie Products, Ltd., Simcoe, Ont., will erect a factory at a cost of \$40,000. R. W. Wallace is secretary.

The Pacific Coast

SAN FRANCISCO, April 18.

WORK will commence at once on a new plant for the Vitriified Products Corporation, San Diego, Cal., at Old Town, to cost about \$175,000 with machinery. It will include grinding and screening mills, machine shop and molding works and will specialize in the production of vitriified sewer pipe and building blocks. Victor Kremer is president.

The Kleiber Motor Co., Los Angeles, has awarded a contract to the Austin Co., Pacific Electric Building, for its one-story plant, 150 x 250 ft., at Santa Fe Avenue and Twenty-fourth Street, to cost \$85,000 including machinery.

The Tacoma Harbor Lumber Co., Tacoma, Wash., recently organized, has acquired seven acres on the waterfront as a site for a new mill. A power house and machine shop will also be built. The plant is estimated to cost \$100,000.

The Western Waxed Paper Co., Monadnock Building, San Francisco, has plans for a new one-story factory on Doyle Street, Oakland, estimated to cost \$70,000 with machinery. R. Vane Woods, 505 Seventeenth Street, Oakland, is architect.

The California Cyanide Co., Los Angeles, care of F. W. Braun, president, the Braun Corporation, 363 New High Street, recently organized, has taken title to property at Cudahy City, near Los Angeles, for its new plant estimated to cost \$750,000. It will include a power house and machine shop. The company is affiliated with the Air Reduction Sales Co., 342 Madison Avenue, New York.

The Northwestern Electric Co., Pittock Block, Portland, Ore., will build a one-story machine and operating shop at the foot of Lincoln Street, estimated to cost \$35,000.

Greenberg & Sons, Inc., 225 Beale Street, San Francisco, will commence the erection of a two-story foundry at Folsom and Alice Streets, to cost about \$25,000. It will be equipped for the production of gray iron castings.

Officials of the Wheeler-Reese Lumber Co., Tacoma, Wash., have organized a subsidiary, the Tacoma Harbor Lumber Co., capitalized at \$100,000, to build a new mill to cost approximately \$80,000 with machinery. A power house will be included. Welles and Henry O. Wheeler head the company.

The Arizona Portland Cement Co., Phoenix, Ariz., has acquired 160 acres of land near Winkelman, Ariz., as a site for a new mill estimated to cost \$800,000. It will consist of a number of units, with power house, machine shop, pumping plant and other departments. Loren C. Barton, Corporation Building, Los Angeles, is assistant general manager in charge.

The Peninsula Oil Burner Co., 2156 Third Street, San Francisco, manufacturer of oil burners and devices, is having plans drawn for a new factory to cost \$20,000.

The Earl Fruit Co., California Fruit Building, Sacramento, Cal., is planning the construction of an ice-manufacturing and refrigerating plant in connection with its new packing plant at Yuba City, Cal., estimated to cost \$100,000 including machinery.

R. S. McClelland, Los Angeles, will build a one-story ice-manufacturing plant, 100 x 105 ft., to cost about \$65,000. A. G. Batley, 410 Junior Orpheum Building, is architect in charge.

Wickwire-Spencer Annual Meeting

The annual meeting of the stockholders of the Wickwire-Spencer Steel Corporation was held in Worcester, April 20, and resulted in some changes on the board. Frank Kilmer, recently resigned as treasurer; H. T. Ramsdell of Buffalo and Jerome R. George of Worcester retire, and George F. Naphen of Naphen & Co., New York, R. B. Young, Boston, and C. K. Anderson, president American Woven Fabric Co., Chicago, a subsidiary, were made directors. Directors re-elected are T. H. Wickwire, T. H. Wickwire, Jr., Ward H. Wickwire, all of Buffalo, L. W. Robinson, Rochester, N. Y., A. F. Stillson, Cortland, N. Y., John A. Denholm, Frank A. Drury, Harry W. Goddard, Paul B. Morgan and John E. White of Worcester, G. W. Treat, Boston, and J. Leonard Replogle, New York. Frank A. Drury, president Merchants' National Bank, Worcester, was elected treasurer to succeed Mr. Kilmer. Winthrop G. Hall was re-elected clerk. The other executive officers will be elected at a meeting of the directors yet to be called.

The Wickwire-Spencer Steel Corporation, including the American Wire Fabrics Corporation, reports a deficit in 1922 of \$809,658, against a deficit in the previous year of \$3,193,632. Only the five months' operations ended Dec. 31 of the

Wire Fabrics Corporation were included. President T. H. Wickwire, Jr., stated that 1922 was a difficult year, but that he "looks forward to good earnings certainly for six months of the year," and possibly throughout the remainder of the year.

Plans of New Companies

The Sanitary Dispensing Machine Corporation, Fredricksburg, Pa., has been incorporated with capital stock of \$500,000, to manufacture vending machines and parts. Future plans are not definitely known, but the company does not contemplate any building or expansion. C. W. Jones is president.

Stephen Hall & Co., Inc., formerly at 90 West Street, New York, has moved to Seventh and Adams Streets, Hoboken, N. J., and the company has been incorporated to manufacture electrical machinery and equipment. It owns a fully equipped plant and is now in operation. The business taken over has been organized for some time and no changes will be made for the present. Stephen M. Hall is president and Ross C. Pack is vice-president.

Eselgroth & Co., 22 Mechanic Street, Newark, N. J., has been incorporated to manufacture metallic compounds, metal products, etc. No actual manufacturing is being done by the company, materials such as dampers, castings for obsolete boilers and furnaces and kindred lines being manufactured under contract. In addition to these activities the company acts as jobber in boilers, furnaces, coal and gas ranges. Aubrey C. Schless is secretary.

The American Write-O-Graph Co., Rochester, N. Y., has been incorporated with capital stock of \$3,000,000 for the purpose of manufacturing and marketing camera attachments. This corporation expects either to build or to buy and remodel a factory. Walston D. Brown, care of the Bombay Oil Co., 360 Main Street East, Rochester, heads the company.

Lightfoot Auto Parts, Inc., Waco, Texas, was recently incorporated to manufacture automobile accessories and parts. It has taken over the Lightfoot Wrecking House business, using what facilities are available for manufacture in the new line. F. L. Lightfoot is manager.

The Thomas-Kerns Co., Rock Island, Ill., has been organized to manufacture vending machines, having purchased the entire assets of the Griswold Mfg. Co., which was established in 1889. The new company will continue in the former lines, including jigs, tools, dies, patterns, etc., and will add new lines from time to time. In addition, the company is entering the light metal specialty engineering field as engineers, manufacturers, contractors, and counsellors. C. P. Thomas is president and general manager.

The Gas Engineering Service Co., Battle Creek, Mich., was recently organized to build and operate gas plants. F. W. Seymour is president and treasurer; D. H. Frazer and Wendell L. Smith, vice-presidents, and D. H. Frazer, Jr., secretary.

The Standard Scale & Supply Corporation, 1631 Liberty Avenue, Pittsburgh, has been organized to purchase and operate under an entirely different management, the business formerly conducted by the Standard Scale & Supply Co. The new corporation will manufacture scales, concrete mixers and contractors' equipment. Branch offices are established at 145 Chambers Street, New York, 523 Arch Street, Philadelphia, 721 St. Clair Avenue, North East, Cleveland, and 163 North May Street, Chicago.

The Brennan Oil Burner Equipment Co., 755 Boylston Street, Boston, has been organized to manufacture combustion fuel oil burners and similar equipment. Plans are not definitely drawn up yet, but will be announced in the near future. J. P. Brennan heads the company. The product will be available for homes, garages, schools or factories.

Charles M. Schwab, chairman Bethlehem Steel Corporation, has agreed to become executive head of the Motor Body Corporation, provided the reorganization plan of the American Motor Body Co. is upheld at stockholders' meeting this week. Provision is made for chartering the new corporation in Delaware and for the acquisition by that corporation of the three companies held by the American company, including the Hale & Kilburn Corporation, Philadelphia, and the Wadsworth Mfg. Co., Detroit. It is understood that Mr. Schwab's acceptance is contingent upon securing a considerable block of stock. Reports indicate that the proposed plan will carry.

The Public Service Electric Power Corporation, recently chartered in Delaware with capital stock of \$20,000,000 preferred stock and 1,000,000 shares of common stock, no par value, plans the erection of a super-power plant. To provide for financing the construction, \$15,000,000 25-year 6 per cent first mortgage bonds have been issued, in addition to \$6,000,000 of the preferred and 300,000 shares of the common stock. Richard E. Danforth was elected president and Henry D. Whitcomb vice-president at a meeting held last week in the offices of the Public Service Corporation of New Jersey.

BOOK REVIEWS

Bensinger Iron and Steel Trade Code. Pages 120 + iv, 7¼ x 9½ in. Published by C. Bensinger Co., 15 Whitehall Street, New York. Price, \$7.50.

Worked out in five letters, complete with specifications and requirements, this code should be of great value to buyers and sellers of iron and steel for reducing cable and telegraph tolls. The book, which is bound in flexible covers, has been made from line cuts prepared from typewritten sheets, and covers a wide variety of subjects beginning with Analysis and running through the alphabet. The tabular portion of the text should figure particularly in cutting down the cost of messages, as it covers fractions, wire and sheet gages, dimensions and other values in wide variety.

Metals and Their Alloys. By Charles Vickers. Pages 767 + xix; 108 figures. Published by Henry Carey Baird & Co., Inc., 2 West Forty-fifth Street, New York. Price, \$7.50 net.

Based partly on Brannet's "Metallic Alloys," this book represents so complete a revision and rewriting of the subject that practically a new book has resulted. The title has been changed to conform more nearly to the characteristics of the present work, which has been modernized and brought up-to-date. It deals with metals from their place of origin to the place where they are applied in commerce and the arts, and covers them both individually and in their capacities as constituent parts of alloys. It shows the use of alloys where strength, ductility, toughness, lightness, color, hardness, cheapness, conductivity or bearing properties are demanded.

As the author has long been a specialist in the melting, alloying and casting of metals, with particular reference to non-ferrous metals, the book is decidedly practical, particularly along the non-ferrous side. Chapters on copper casting and the making of manganese bronze, aluminum bronze and other aluminum alloys, together with different brasses, steam metals and nickel alloys are crowded with formulas which have been tested and tried in application, and with information regarding the physical properties of the various alloys and their casting peculiarities. The material is presented in a way to be of use both to the technical worker and the man untrained in chemistry or other technique.

Special attention has been called to the chapters on Monel metal, magnesium alloys and die casting, including the die casting of bronze. Foundry uses of scrap metals cover a subject rarely treated in this way.

Information in regard to smelting and refining is somewhat brief, and includes only such facts as would be particularly desirable to the user of alloys. The iron and steel alloys also are covered briefly. Sand castings, as well as die casting and rolling, are described, while the work is completed with a glossary of foundry and other terms and an index sufficiently in detail to be of great value in using the book for reference.

From its very size, the book has packed within its covers an immense amount of information drawn both from the author's practice and from a wide variety of other sources. Credit is given to the Watertown Arsenal for some of the historic tests which have been made at that institution and, altogether, the work is of exceptional value to those studying or operating along this particular line.

The success accompanying the publication of Schieren's Leather Belting Handbook has led that firm to extend its publication to 18 sections instead of 12 as originally planned. This book is now being distributed by the Charles A. Schieren Co., 37 Ferry Street, New York. It is published in sections, a section appearing each month in the advertising pages of THE IRON AGE. The publication is intended to be a

practical manual on belting and power transmission for engineer, plant executives, production managers, maintenance men, factory superintendents, foremen and purchasing agents. It includes a discussion of the different types of drives; practical facts about belting, such as belting rules and ratings, horsepower, etc., care and operation; proper methods of joining the ends of belts; alinement of drives; moist conditions; V and round belting; methods for most economical arrangement of belt drives; locating motors, and sizes of shafting. A copy of the handbook may be obtained on request.

The adaptation of college curricula to job requirements is discussed in a new book entitled "Job Analysis and the Curriculum," written by Dr. Edward K. Strong, Jr., professor of educational research, Carnegie Institute of Technology, and Richard S. Uhrbrock, employment supervisor, traffic department, Western Union Telegraph Co., New York. This book outlines a new method for the development of a curriculum for the training of young men to become commercial printing executives; but it is felt that it has a message for executives in every industry where new men must be trained for important jobs. The book is based upon researches made at Carnegie Institute of Technology. Williams & Wilkins Co., Baltimore, is the publisher.

NEW TRADE PUBLICATIONS

Metal Hose and Couplings.—The Pennsylvania Flexible Metallic Tubing Co., 201 North Broad Street, Philadelphia. Bulletin No. 55B shows by word and picture the various kinds and uses of Penflex all-metal heavy duty hose and couplings for tank car unloading. Separate views show the hose in cross-section and the entire outfit assembled. Size, 4 pages, 8 x 11 in.

Pipe Threading Equipment.—Landis Machine Co., Inc., Waynesboro, Pa. Catalog No. 27, 75 pages, 6 x 9 in. illustrates and describes the companies' stationary pipe die heads, pipe threading and cutting machines, rotary pipe and nipple threading die heads, pipe and nipple threading machines, automatic die heads and the Landis chaser grinder. Distinctive features are outlined, specifications given and also names of parts for ordering repairs.

Flexible Shafts and Equipments.—N. A. Strand & Co., Chicago, Catalog No. 22, 28 pages. Various types of machines are illustrated and described, specifications given and the application of each outlined. Metal pattern makers equipment and power screw driving and nut setting machines are included in the catalog.

The Pow-R-full Motor.—Wagner Electric Corporation, St. Louis. In Bulletin 132, 8 x 10½ in., is described and profusely illustrated a heavy duty motor of constant speed, high torque and great strength and overload capacity. Attention is called in the bulletin to methods adopted for obtaining cool running, to the substantial size of the shafts and bearings, the high quality of insulation, quiet operation, ease in connecting into the circuit, and other features of this motor. It is said to have longer life and greater relative freedom from trouble under severe operating conditions than previous motors.

Lackawanna Sheet Steel Piling.—Bethlehem Steel Co., Bethlehem, Pa. A 28-page pamphlet 8 x 10½ in., illustrating and describing the sheet steel piling of both the arched web and the straight web type, as made by the Lackawanna Works of the Bethlehem Steel Co. The pamphlet is full of tables and shows the use of the piling and weights of various sections for various purposes. Illustrations are given of corner sections, splice bars, built-up cylinders for caissons, etc.

The annual meeting of the Cincinnati Association of Purchasing Agents was held Tuesday, April 17, following a dinner and a musical entertainment. All the officers were re-elected. Plans were made for attending the convention of the National association at Cleveland, and it is expected that 100 members of the Cincinnati association will make the trip.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.54c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.54c.
Hoops, base price	5.19c.
Bands, base price	4.39c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base	3.64c.
Channels, angles and tees under 3 in.	
x ¼ in., base	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.80c.
Toe-calk, ½ x ¾ in. and larger	4.60c.
Cold-rolled strip, soft and quarter hard	7.50c. to 8.50c.
Open-hearth spring-steel	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds	4.40c.
Squares, flats and hex	4.90c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High speed steel, 18 per cent tungsten	75c. to 80c.

Tank Plates—Steel

¼ in. and heavier	3.64c.
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Sheets

	Per Lb.
No. 10	4.59c.
No. 12	4.64c.
No. 14	4.69c.
No. 16	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.90c. to 5.30c.	.....
Nos. 22 and 24	4.95c. to 5.35c.	5.60c.
No. 26	5.00c. to 5.15c.	5.65c.
No. 28	5.10c. to 5.50c.	5.75c.
No. 30	5.30c. to 5.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	5.20c. to 5.60c.
No. 16	5.35c. to 5.75c.
Nos. 18 and 20	5.50c. to 5.90c.
Nos. 22 and 24	5.65c. to 5.95c.
No. 26	5.80c. to 6.20c.
No. 27	5.95c. to 6.35c.
No. 28	6.10c. to 6.50c.
No. 30	6.60c. to 7.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		Wrought Iron	
Black	Galv.	Black	Galv.
½ in. Butt...	—44 —29	½ in. Butt...	—4 +19
¾ in. Butt...	—49 —36	¾ in. Butt...	—11 +9
1-3 in. Butt...	—52 —33	1-1½ in. Butt	—14 +6
2½-6 in. Lap.	—48 —35	2 in. Lap....	—5 +14
7-8 in. Lap...	—44 —17	2½-6 in. Lap.	—9 +9
9-12 in. Lap..	—38 —14	7-12 in. Lap..	—3 +16

Steel Wire

	Per Lb.
Bright basic	5.00c.
Annealed soft	5.00c.
Galvanized annealed	5.65c.
Coppered basic	5.65c.
Tinned soft Bessemer	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	21¾c. to 22¾c.
High brass wire	22¾c. to 23¾c.
Brass rods	19¾c. to 20¾c.
Brass tube, brazed	28¾c. to 29¾c.
Brass tube, seamless	25¾c. to 26¾c.
Copper tube, seamless	27¾c. to 28 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 25½c. to 26½c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates

Bright Tin	Grade	Grade	Coke—14-20	Prime	Wasters
	"AAA"	"A"			
	Charcoal	Charcoal			
	14x20	14x20			
IC..	\$11.00	\$9.75	80 lb..	\$6.30	\$6.05
IX..	12.25	11.00	90 lb..	6.40	6.15
IXX..	13.50	12.25	100 lb..	6.50	6.25
IXXX..	14.75	13.50	IC..	6.65	6.40
IXXXX..	16.50	14.75	IX..	7.65	7.40
			IXX..	8.65	8.40
			IXXX..	9.65	9.40
			IXXXX..	10.65	10.40

Terne Plates

8-lb. coating, 14 x 20	
100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	48c.
Bar	55c. to 60c.

Copper

Lake ingot	19 c.
Electrolytic	18½c.
Casting	18¼c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	11c. open 11½c.

Lead and Solder*

American pig lead	9¾c. to 9¾c.
Bar lead	12½c. to 14c.
Solder, ½ and ½ guaranteed	33½c.
No. 1 solder	31½c.
Refined solder	28c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	10c. to 11c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	32c. to 33c.
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Old Metals

Business continues quiet with values lower. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	14.25
Copper, heavy wire	13.75
Copper, light and bottoms	11.75
Brass, heavy	8.00
Brass, light	6.50
Heavy machine composition	11.25
No. 1 yellow brass turnings	8.25
No. 1 red brass or composition turnings	10.25
Lead, heavy	7.00
Lead, tea	5.00
Zinc	4.50